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The Necessity for Sustainable Development in Indonesia: A Governmental Analysis and Carbon Neutral Coliving Recommendation

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Chapter 1: Introduction

Sustainable development is the core of this thesis. We span a variety of different topics throughout our discussion, ranging from a governmental analysis of Indonesia to philosophical discussions about the necessity of community in coliving spaces. Ultimately, our argument is unified by a common sentiment to promote sustainable practices.

This thesis divides itself into four key body chapters. The first two are centered around the Indonesian government, with particular attention paid to current emissions and sustainable developments within the country. The latter two make a stark shift towards discussing the increasing prevalence of coliving spaces. The connecting thread between these two broad themes is the propensity for a carbon neutral coliving space to offer a solution to Indonesia's high emissions and poor sustainable developments.

In Chapter 2, we accentuate the natural richness of Indonesia, its critical role in the broader environmental health of our planet, and how preserving such natural richness is in the Indonesian government's best interest. Our argument in Chapter 2 exposes how the exceptional tourist growth in Indonesia will only be maintained if the natural wonders of the country are maintained as well. Thus, we are able to successfully make an argument for the implementation of sustainabile practices based on economics. The reason for doing such stems from the sad fact that pointing to systematic global warming and the deterioration of earth's most essential ecosystems has been an ineffective argument in motivating sustainable developments.

Chapters 2 and 3 connect in their shared discussion about the challenges associated with tourism development, international institutional support, and the disenfranchisement of indigenous populations. We specifically shed light upon the combatting national and local interests within the country.

Chapter 3 further concretizes the necessity to transition away from primarily heavy fossil fuel consumption to the implementation of renewable energies. To do so, we employ the economic argument that immense coal usage within Indonesia results in immense negative externality costs to the nation. In doing so, we make the obvious point that coal is an extremely pollutive energy source that not only damages our planet but results in significant negative health effects for Indonesian citizens.

Chapter 4 marks a significant transition away from an Indonesian focus to analyzing trends associated with travel and the increasing nomadic lifestyle among younger generations. We point to the fact that Millennials are universally less likely to be homeowners for a variety of reasons that are both economic and cultural. This discussion serves as a precursor for the latter half of Chapter 4, which is a comparative analysis of three coliving companies, and Chapter 5.

In our comparison of existing coliving companies, we explore what are the successful components of two of the largest existing companies at the moment: Roam and Outsite. Furthermore, we briefly explore the philosophy of the yet to be developed company Comunita and their prioritization of sustainability.

Finally, Chapter 5 serves to outline the components of a sustainable coliving space acknowledging the cultural importance of the location where it resides. This begins with an exploration into passive design strategies, a high-performance building envelope, and the incorporation of on-site renewable energies. This discussion pertains to the equatorial-tropical environment of Indonesia and includes a framework for how a coliving space ought to include existing architectural traditions of the location where it will be constructed.

These chapters, in sum, serve to offer a humble example for the Indonesian government to begin its incremental path towards sustainability. Furthermore, they serve to exemplify

increasing globalization, how coliving spaces align with that trend, and how the incorporation of sustainable practices are a logical preference in their development.

Chapter 2: Natural Richness of Indonesia Driving Exceptional Tourism GDP

This chapter serves to develop an understanding of the necessity for promoting sustainable developments within Indonesia. To develop a fundamental understanding of such, this chapter will be broken down into three parts: (1) we will explore Indonesia's impressive natural wonders and how they are critical to our planet's health; (2) outline their exemplary tourist growth while acknowledging global tourist motivation to extrapolate the fundamental importance for Indonesia to implement sustainable development practices to continue to drive tourism growth; (3) analyze their economic competitiveness to determine the feasibility of implementing sustainable development practices. Together, these three focal points emphasize the necessity for a transition to renewable energy use and utilization of future sustainable development practices.

Indonesia's Biodiversity and Global Climate Influence

Indonesia impressively stands as one of the world's most diverse countries in terms of wildlife and geographic diversity. Fully exploring the biodiversity and natural wonders of this nation would require an extensive analysis beyond the scope of this research. Nonetheless, a brief overview of the natural wonders of the nation will set the scene for why sustainable energy practices are in the best interest of our global health. Furthermore, they will serve as a precursor for our argument as to why the Indonesian government ought to prioritize sustainable development goals for grander developmental purposes.

Indonesia is the world's largest archipelagic country–in other words, a country comprised of a series of islands. They have over 17,000 islands which boast the natural richness and biodiversity of the nation. In fact, the Ran organization acknowledges them as one of the richest biodiverse countries in the world, with vast tropical rainforests and the possession of significant

energy and mineral resources.[1] The country contains a variety of natural wonders: including the world's largest mangrove forests, volcanoes emerging from tropical islands, sea reefs housing the world's greatest diversity of coral fish, and extensive rainforests. Now, we could analyze how each of these natural wonders contributes to our planet's healthy ecosystem, however, we will only perform a surface-level analysis of the Indonesian rainforest to accentuate the necessity for preservation from a global perspective.

The rainforests in Indonesia are considered the third largest in the world behind the Amazon and Congo Basin. Indonesia only covers 1 percent of the land area on Earth, yet it's rainforests, incredibly, contain "10 percent of the world's known plant species, 12 percent of mammal species. . .and 17 percent of all known bird species."[2] These rainforests are more than just a magnificent home to some of the most diverse animal and plant populations across the globe, as they are critical for our planet's greater health.

Rainforests are commonly referred to as the lungs of the world: the Yale School of Forestry and Environmental Study found that all tropical rainforests contain roughly 25% of the world's carbon.[3] In turn, these forests convert this carbon into breathable oxygen. To emphasize the importance of carbon storage and oxygen production from rainforests, it is estimated that the entire deforestation of the Amazon would emit an amount of carbon into the atmosphere equivalent to 140 years of global human-induced carbon emissions.[4]

Not only are rainforests the lungs for the Earth, but they are fundamentally necessary for regulating our climate through water circulation: more than half of the Earth's rainwater is stored among rainforests and recycled throughout the globe with cloud circulation. Without the process

[1] See Indonesia's Rainforests: Biodiversity and Endangered Species
[2] Ibid.
[3] See Trust, R.
[4] Ibid.

of rainforests recycling massive quantities of water, disease and famine would multiply because of perpetual droughts.[5] Preserving the Indonesian rainforest is necessary for maintaining our planet's healthy ecological systems. However, the message that such natural components are necessary to preserve earth's health and combat global warming has been ineffective. Thus, the environmental argument need not rely on human fear of natural biodiversity deterioration, but rather an institutional argument exemplifying the economic and governmental benefits associated with sustainability.

Environmental Prioritization for Tourism Development

We outlined the importance of preserving Indonesia's forests and other natural wonders for the purpose of our planet's greater health. Also, we acquiesced to the fact that accentuating such importance has proven to be an ineffective argument at combatting non-sustainable practices. Consequently, our argument will shift to the importance of tourism in Indonesia and, specifically, underpin the connection between tourism and the nation's natural wonders. To do this, we will dive into a two part analysis: first, we will exemplify the growing importance of tourism to the Indonesian economy; second, we will look into current governmental initiatives to drive tourism (specifically the 10 New Balis) in order to understand the relevance of ecotourism from both a local and national perspective.

Indonesia's tourism industry is a key contributor to the nation's GDP, and its rapid growth exemplifies its future importance for the Indonesian economy. Looking at GDP and tourist arrival figures, we see that Indonesia's global competitiveness for tourism has quickly increased over recent years: in 2019, the country ranked 40th in the world tourist industry, where they stood at 70th just six years prior.[6] This jump in competitiveness is also exemplified by GDP

[5] See WRI
[6] See World Economic Forum, Specifically WEF Travel and Tourism Competitiveness Report, 2013 & 2019

figures and growth rates: where in 2018 tourism contributed to 6% of the nation's GDP ($66.8 billion of the total 2018 GDP of $1.042 trillion) and the growth rate of GDP produced by tourism was twice the global average.[7] These macroeconomic figures show that tourism is a significant contributor to Indonesia's GDP and that its contribution is significantly growing.

Comparatively to southeast Asian countries, Indonesia does not collect as large a percentage of GDP from tourism than its neighbors. However, their growth is still comparatively advantageous. The Oxford Business Group reported that Malaysia and Thailand's tourism sectors contribute 16% and 20%, respectively, to their GDP which greatly outweighs Indonesia's tourism contribution.[8] However, they also note that Indonesia's tourism growth rate is double that of both the global and ASEAN (Association of Southeast Asian Nations) averages. Such comparative growth is something that Arief Yahya, the former Indonesian Minister of Tourism through 2019, has acknowledged and prioritized in their growth initiatives to meet tourism projections.

Here, marks a good transitioning point to begin our analysis of legislative initiatives implemented by the Indonesian Ministry of Tourism. During this analysis, we will overview the initiatives set in place by Arief Yahya to understand what areas the Ministry of Tourism prioritizes in their goal to sustain their exceptional tourism growth.

Arief Yahya stated that there are two key variables posing challenges to tourism expansions: first, a lack of openness due to restrictive international access regulations–in other words, existing bureaucratic barriers restricting foreigner's access to tourist visas; second, a lack of infrastructure preventing direct flights to many of the nation's promising tourist destinations. Arief Yahya claims that the Indonesian government has taken promising strides to address the

[7] See World Travel and Tourism Council
[8] See Arief Yahya, Minister of Tourism: Interview

first challenge and alleviate international tourist restrictions by removing visa requirements. To concretize this point, he accentuated that Indonesia has 169 nations on its visa free list, categorizing it, now, as one of the top nations in the world.[9] The second challenge, however, still requires much attention. Indonesia's development across its islands are limited, and the Ministry of Tourism recognizes such.

The majority of tourists visiting Indonesia flock to Bali, hence the recent initiative for the "10 New Balis." 2016 statistics showed that foreign tourists spent 49% of their time in Bali and 30% in Java (the neighboring Island that is home to the capital, Jakarta); these two Islands, however, only cover 7.6% of Indonesia's land mass.[10] The Ministry of Tourism along with President Jokowi acknowledge that Indonesia houses immense geographic space and diversity outside of these two islands. Consequently, they are using Bali as the infamous tourist destination of the country and attempting to replicate such success in ten new locations.

Below, is a non-detailed map of Indonesia highlighting the ten new locations.

Source: The Straits Times

[9] Ibid.
[10] See Haan, J. de.

To provide reference from Bali, it is the Island to the East (to the right on the Map) of Java and directly West of Mandalika, Lombok. As the map portrays, these ten new locations are quite spread out, thus will require significant infrastructure development. Now, how necessary is it for that development to be sustainable? Well, per our argument connecting the growth of tourism with sustaining the natural wonders of Indonesia, each of these locations necessitates the use of sustainable development.

Scholarly literature directly showing causality between tourist motivation to travel and natural wonders within Indonesia is scarce and not robust. So, to answer the question, "how necessary is it for these '10 New Balis' to be developed sustainably?" we will exemplify two points: first, we will perform a broad overview of two destinations (to serve as case studies for the ten at large) and underpin their natural magnificence through biodiversity and geographical explanations. Our two chosen locations are Wakatobi and Lake Toba. Second, we will look into relations between the Indonesian government and indigenous cultures in the these two locations to highlight the necessity for existing cultural acknowledgement in these new destinations.

Wakatobi stands as one of the most impressive coastal locations in the world because of its biodiverse underwater life. The official Indonesian travel website names the location, "Wakatobi National Marine Park, Underwater Paradise in The Heart of Asia-Pacific Coral Triangle."[11] The mere fact that the location is a national park highlights the importance of the natural wonders existing there. However, Wakatobi stands impressive from a global scale. It is acknowledged as having the greatest number of reef and fish species on our planet and stands as the second largest barrier reef in the world (after the Great Barrier Reef in Australia).[12] The

[11] See Wakatobi National Marine Park – Indonesia Travel
[12] Ibid.

living organisms here are of immense number: 942 fish species live there and 750 coral reef species (out of the 850 known globally) call this place home.[13] The destination boasts, arguably, the most magnificent and biodiverse underwater scene that exists on our planet.

This underwater diversity drives diving attraction, a tourism activity that directly connects with its beauty. The Indonesian government understands the gem that is Wakatobi and markets it to divers as a significantly more impressive site than its global competitors: taking Wakatobi's fish and coral diversity and comparing them with the Carribean Sea's 50 and Red Sea's 300 coral reef species accentuates its comparative biodiversity.[14] The establishment of Wakatobi as a national park along with direct marketing efforts from the Ministry of Tourism about its diving sites shows the governments acknowledgement about the importance of its underwater habitats.

The protection and development of Wakatobi, however, comes with critical challenges for the indigenous people. The Bajau tribe is the primary indigenous population to the area, particularly the sea. They are referred to as sea-gypsies because they have long lived there on houseboats and over-water-tilt homes, surviving by fishing, and constructing what they need with the natural resources available to them. Often times, their fishing practices are considered destructive and a primary cause of overfishing in the area.[15] Furthermore, the abundance of mangrove bogs in the Wakatobi region offer an easy means of gathering building materials; now, however, marine conservationists have deemed mangroves one of the critical components of maintaining a healthy tropical coastal ecosystem.[16] This contradiction between historical

[13] Ibid.
[14] Ibid.
[15] See Elliot, G. et al.
[16] See Kaye, M.

practices of the Bajau with that of recent conservationist efforts has developed challenges for their fundamental living practices.

How could this problem be reconciled? Well the answer requires a rigorous analysis to truly unpack the nuances between land and sea dwellers in Wakatobi and how their interests are represented in conservationist legislation. For the purpose of our argument, however, we can state that a holistic acknowledgement of indigenous tribe interests in the Wakatobi ought to have been recognized. In the future, the same is essential.

Lake Toba lies a great distance away from Wakatobi on the island of Sumatra. It has a fascinating history: around 74 thousand years ago, Lake Toba was the site of the largest volcanic eruption to occur in the past two million years.[17] Now, it stands as a tropical paradise with cool air and lush vegetated mountains rolling down to the lake.[18] In Piper's National Geographic account about Lake Toba, he notes that it feels more like an ocean than lake: it is the largest volcanic crater lake on earth with depths greater than 450 meters.[19]

Tourism attractions for Lake Toba fall under the category of rather peaceful and harmonious activities: such as kayaking across the lake, relaxing lakeside in the cool air, and partaking in cultural activities from the Batak tribe and Tomok and Simanindo ethnic groups.[20] These indigenous communities, however, are being disenfranchised and intimidated by the Indonesian government's initiatives in the areas.

Land rights are the crux of the problem: that is, determining what belongs to the community residing in the Sigapiton village versus the Lake Toba Authority (BPODT) for

[17] See Piper, J.
[18] Ibid.
[19] Ibid.
[20] See The Gigantic Ancient Crater – Lake Toba – Indonesia Travel

tourism.[21] Land, which historically belonged to this indigenous group, has been ceased by BPODT; furthermore, protests were prevented when President Joko Widodo visited the area in 2019 and talks between the indigenous people and conservation officials (such as, the Office of the Coordinating Maritime Affairs Minister, the Environmental and Forestry Ministry, and the Tourism Ministy) were blocked by BPODT.[22] Further efforts by members of the Sigapiton village have been ousted which does not bode well for future cultural developments in the area. If Lake Toba is to be a sustainable natural paradise boasting cultural richness, sub-national and national level governmental entities need respect the interests of local communities. Creating enemies will only develop tensions in the area that will compromise the harmonious image of Lake Toba.

Lake Toba and Wakatobi are representative case studies for the remaining eight locations in the "10 New Balis" plan: they are both remote, minimally industrialized, they boast unique natural wonders, and exemplify the complications between modernization and the respect of indigenous communities. So, it seems the Indonesian government has taken steps to develop these areas and that they will unconditionally continue to do so. Consequently, our proposal for the carbon-neutral co-living space is to develop a plan that can satisfy both the Indonesian government and local communities.

Our plan is to accomplish such through sustainable design and a critical acknowledgment of local interests. We will explore the nuances of this in Chapter 5, but as an overview, our design will utilize local materials and implement passive design strategies to offer a solution for sustainable building. The second critical component of our vision is the inclusion of historical philosophies about design and the integration of cultural practices within the environment.

[21] See Gunawan, A.
[22] Ibid.

Accomplishing such will require the direct collaboration with indigenous communities, which will be location specific. As exemplified by the differences between Wakatobi and Lake Toba, these interests vary greatly, thus our proposal will not outline specific local interests, but rather offer a framework for how sustainable developments can collaborate with indigenous populations in different locations.

Current Energy Use and Sustainable Readiness

This final section serves as a broad overview of Indonesia's current energy consumption, where their emissions stand, and whether or not it is appropriate to argue for the implementation of sustainable practices based on their development. This section will establish our understanding of current energy consumption within the country, which will, in turn, serve to contextualize the discussion and arguments within Chapter 3. Furthermore, our previous discussion in this chapter assumed that the continuation of tourist development necessitates the implementation of sustainable practices. However, we have not shown that the country is in fact capable of this type of modern coordination.

The purpose of proving their readiness is not to show that they are, in absolute terms, ready for the integration of sustainable developments. Doing such would require having the implementation of sustainable energies be a binary decision: that is, to implement in entirety or not at all. Sustainable developments, however, are much more complicated than that and incremental improvements. Thus, our argument about Indonesia's readiness for sustainable development will utilize metrics from the World Economic Forum's Competitive Index to show their general readiness.

Indonesia is home to an abundance of mineral and energy resources, in the form of both fossil fuels and renewable resources. The country has historically utilized this richness of natural

resources to propel its economy: they are a "major producer and exporter of minerals (e.g. nickel ore, bauxite, tin and copper), energy resources (steam coal, natural gas and crude oil) and agricultural products (crude palm oil, rubber, seafood, rice and spices)."[23] Overall, natural resources account for more than 20% of GDP and half of Indonesia's exports.[24] The country, historically relied on oil as a domestic energy source and driver of GDP, however such has declined over the past two decades due to significant global oil demand causing a depletion of their domestic oil reserves: they became an oil importer in 2004 and have experienced a significant decline in crude oil use domestically from 31% in 2005 to just 6% in 2016.[25]

Indonesia's decreasing domestic supply of oil has been replaced by other fossil fuels, which perpetuates the country's poor renewable energy utilization and high emissions. Natural gas and coal, respectively, made up 26% and 54%, of the country's energy consumption in 2016.[26] In comparison to other OECD countries and the G20, Indonesia performs poorly in regard to the share of renewable electricity production and carbon intensity electricity production: where they have the 6th lowest share of renewables in production and are among the three highest of carbon intensity from power generation.[27] The externalities that have accompanied Indonesia's shift to coal usage and lacking capacity to implement renewables are exemplified by their emissions of more than 1,400 million tonnes of CO_2 per year, which places them among the world's top 10 GHG emitters.[28]

The country has a history of utilizing the resources readily available to electrify and power its country. In the past that was fossil fuels because of technological availability. Now,

[23] See OECD, p. 4
[24] Ibid.
[25] Ibid. p. 7
[26] Ibid.
[27] Ibid.
[28] See WRI

however, as technologies for renewables become readily available, it is becoming abundantly clear that Indonesia has the immense tidal, geothermal, and solar power availability. For example, Indonesia currently exploits only 5% of its nearly 30GW geothermal energy potential (estimated at approximately 40% of world capacity) and 4% of its 75GW hydroelectricity potential.[29] So why has emission counteraction been stifled?

Counteracting high emissions proves to be a difficult problem for the Indonesian government because of the current reliance on coal, the expectation that coal will continue to be Indonesia's primary energy source, and limited developments in the renewable sphere. From the energy use breakdown, we can see that Indonesia relies primarily on fossil fuels and minimally on renewables. The country does have the capacity to utilize renewables because of their endowment of resources. We will show in Chapter 3 that it is in the governments best interest to utilize renewable resources from an economic perspective. For now, however, let us continue our discussion about the legitimacy of expecting a sustainable transition.

The theoretical recommendation for energy consumption, per an environmental conscious perspective, is to propose a paradigmatic shift towards renewable energy utilization. However, we must take a pragmatic approach, and ask whether Indonesia is sufficiently developed in order to appropriately compare and expect them to utilize renewables relative to the global leaders in sustainability.

To answer this question, we will rely on the metrics provided by the World Economic Forum's, *The Global Competitiveness Report*. This report is widely accepted as a proxy for the broad competitiveness of a country, as it utilizes a variety of different metrics that provide a holistic view into a country's prospect for economic growth and prosperity. The introduction of

[29] See OECD p. 2

the 2017-2018 report provides a nice explanatory line about the legitimacy of the Global Competitiveness Index (GCI): "It assesses the factors and institutions identified by empirical and theoretical research as determining improvements in productivity, which in turn is the main determinant of long-term growth and an essential factor in economic growth and prosperity."[30] Furthermore, their variation of pillars used to index a country's competitiveness gives us a broad overview of where Indonesia is thriving and where they need significant improvement. In analyzing these pillars, we will be able to determine the feasibility of expecting the nation to successfully implement sustainable developments.

Indonesia sits at 37th out of 137 countries–which can be categorized as the upper end of global competitiveness–in the GCI.[31] They perform well in a variety of fundamental market indicators that allude to an appropriate competitive climate poised for improvement: market size ranks 9th and macroeconomic environment 26th.[32] Furthermore, for innovation and sophisticated measures, Indonesia performs above their holistic rank with innovation at 31st and business sophistication at 32nd.[33] The World Economic Forum states that these two pillars are key for the development of innovation-driven economies.[34] And the implementation of sustainable energies within any country hinges on the presence of an innovative economy. The report shows through its pillars that Indonesia's economy has fundamental strengths and a relatively high level of sophistication and innovation. This suggests a promising picture for future development.

We must acknowledge that some metrics from the GCI accentuate prospective challenges for Indonesia: particularly technological readiness where they are ranked 80th.[35] However, if this

[30] See Schwab, C. & Sala-i-Martín, X. (2018b) p. vii
[31] See Schwab, C. & Sala-i-Martín, X. (2018b)
[32] Ibid.
[33] Ibid.
[34] See Schwab, C. & Sala-i-Martín, X. (2018a), p. 12
[35] See Schwab, C. & Sala-i-Martín, X. (2018b), p. 2

metric is analyzed more closely, it becomes clear that technological readiness refers to technologies closely related to the internet, internet of things, and broadband coverage. We, on the other hand, are searching for the capacity to implement technologies related to sustainable readiness.

To concretize their capacity for sustainable energy implementation, we need look further into the Innovation pillar. Specifically, we are searching for an answer that will reaffirm our argument: the Indonesian government proves ready and capable to begin a substantial transition towards utilizing sustainable energies. Under the Innovation pillar provided by the World Economic Forum, they provide a breakdown of the different metrics determining Indonesia's rank of 31; there are seven sub-points and for our argument government procurement of advanced technology products proves to be an apt metric. And Indonesia ranks 12th globally for this.[36] Consequently, the broad economic analysis of Indonesia points to the fact that they are, in fact, ready and capable to competitively implement sustainable energies.

Thus, our previous arguments about the necessity to protect the natural wonders within the country stand legitimate. Furthermore, this overview of the Indonesian economy establishes credibility for a portion of our discussion in Chapter 3: fossil fuel reliance causes immense negative health externalities for the Indonesian government.

[36] Ibid.

Chapter 3: Institutional Incentives for Sustainable Development

Now that we have outlined the connection between economic prosperity and tourism within Indonesia and proven the country's capacity for sustainable transition, let us explore the broader market incentives associated with sustainable development. This chapter will begin with an overview of current emissions and energy use along with a brief explanation of the country's sustainable development goals. This discussion will serve to deepen our understanding of the energy utilization space within the country, which will, in turn, provide foundational knowledge for the subsequent analysis and discussion.

For the purpose of advocating for sustainable practices in Indonesia, we will explore two critical areas that show the economic benefits that come with the transition towards sustainability: first, we will explore the negative health effects associated with poor environmental standards within the country. This will accentuate the accumulated cost of poor health caused by fossil fuel emissions. Second, we will unpack Indonesia's relationship with REDD+ (Reducing Emissions from Deforestation and forest Degradation) and other external institutions to exemplify the importance of exterior institutional incentives to become sustainable.

The latter, however, is complicated and requires a discussion of the challenges associated with external support; particularly, how can international funding be structured to ensure the rights of local populations are not compromised. These two points operate independently of one another and come to different conclusions: for the former, our analysis will show that sustainable changes benefit both the health of the Indonesian people and also the country's economy at large. As for our analysis of external international support, we cannot make a generalization about whether it is good or bad. However, we are able to draw the conclusion that further initiatives

must acknowledge local populations and orient their projects in a manner that is respectful of these groups.

Negative Externalities Stemming from Coal Induced Pollution

Negative health effects stem from a lack of sustainable practices within Indonesia. Poor air quality has proven to be a significant problem because of the historical prominence of peat fires, the increasing utilization of coal over the past decade, and poor transportation emission standards. In this section, we will focus on the harmful components of coal and the benefits that come with a transition to renewable energies–because this most directly connects to our subsequent proposition of a carbon-neutral co-living space; we will analyze the health costs associated with air pollution to provide a clear picture of the costs accumulated from air-pollution induced respiratory illnesses.

Our argument about a transition away from coal will follow this framework: what is the status of coal within Indonesia? What are the negative health effects associated with coal burning? Then, what are the observed and projected costs stemming from coal-induced illnesses? Finally, can we make an argument that these induced healthcare costs are problematic because they are more than just inhumane, but, in fact, economically illogical? In answering each of these questions, we will show that continuing to subsidize coal is not in the best interest of the Indonesian government because of surmountable healthcare externalities and the comparative economic advantage of transitioning to renewable energy.

Addressing the issue of air pollution, particularly induced by coal, is difficult from a governmental perspective because of the combatting initiatives to subsidize coal and improve air quality. Consequently, our argument needs to show that the possibility of disengaging with coal production exists and could be a long-term economic benefit for the nation.

Coal plays a significant role in both the Indonesian economy and national access to electricity. They are among the world's five largest producers of coal and the second greatest exporter.[37] Furthermore, coal fuels the nation's electricity needs and that reliance has only been increasing over the past decade: 60% of Indonesia's electricity production is sourced from coal power plants, and that amount is expected to double by 2027.[38] These projections from experts are in direct contradiction to the aims of the Indonesian government outlined in their sustainability goals. So, can we expect the Indonesian government to promote a transition to sustainable energies? And if so, why should we?

From the mere fact that Indonesia has rich renewable resources at their disposal, we can confidently say that it is a feasible goal for them to transition. Indonesia's primary reliance on coal cannot be excused because of this richness in renewables. In fact, the OECD acknowledges Indonesia as being one of the world's most renewable-rich countries: they have significant potential to harness geothermal, hydropower, biofuel, tidal, solar and wind energy; the organization notes that Indonesia has developed less than 2% of its renewable potential.[39] This low utilization rate not only reflects poorly for the environment at large, but exemplifies Indonesia's necessity to rapidly increase their renewable use: firstly, from an environmental perspective; secondly, from a governmental one. They have made a commitment to source 23% of total primary energy supply from new and renewable energy sources by 2025.[40] Accomplishing such is extremely ambitious because of the current reliance on fossil fuels.

[37] See International Energy Agency from 2017
[38] See MEMR 2018
[39] See OECD, p. 7
[40] Ibid. p. 8

Nonetheless, our argument intends to motivate changes in energy consumption within the country, and this begins with understanding the domestic health problems associated with coal production.

Shifting away from coal will not be an easy feat because of the existing dependence upon it. Clearly it is a significant driver of export GDP and a fundamental resource in powering the country. Nonetheless, the prevalence of coal power plants on the densely populated island of Java has led to unignorable health consequences: to underscore the concentration of coal power plants in urban areas, note that, in 2017, there were 22 coal power plants operating within 100 kilometers of Jakarta.[41] The problems associated with these plants need to be addressed and solutions need be found.

The problem begins with the fact that the Indonesian government has fallen short of detecting pollution levels throughout the country, and that their coal power plants have comparatively worse emission standards than their neighboring countries (specifically China and India). In 2017, the average annual $PM_{2.5}$ (Particulate Matter) level was 28.4 $\mu g/m^3$, which greatly exceeds the World Health Organizations Air Quality Guideline of 10 $\mu g/m^3$.[42] This proves to be a significant problem for Indonesia for three primary reasons: one, particulate matter causes serious cardiovascular and respiratory illnesses; two, measurements for these pollutants throughout the rest of the nation are scarce;[43] three, Indonesia has fallen short in curbing these emissions because of the fact that their emission standards for noxious chemicals (particulate matter, sulfur dioxide and nitrogen oxides) at coal power plants are roughly seven times higher than China and India's.[44]

[41] See Greenpeace 2017
[42] See AirNow
[43] See Real-time Air Quality Index (AQI)
[44] See Greenpeace 2017

Overall, air quality in Indonesia is so poor that, according to the Air Quality Life Index, the average Indonesian citizen can expect to lose 1.2 years of life expectancy from current pollution levels; this figure jumps in areas like Jakarta, where pollution is strong, to 2.3 years and can reach up to 4 in other areas of the country.[45] Jakarta, the nation's capital, is undoubtedly highly polluted by dense transportation, yet placing a considerable amount of coal plants in close proximity to this urban center only exacerbates the problem.

The combination of healthcare costs from these coal induced pollutants with that of the comparatively high cost of subsidizing coal, in comparison to renewables, shows that an energy transition could doubly reduce governmental expenditures in healthcare and energy. A study conducted by the Harvard T. Chan School of Public Health and the World Economic Forum estimated that respiratory diseases could accumulate up to USD 805 billion between 2012 and 2030. [46] To put this number in perspective, consider that the foreign exchange revenues of coal exports in Indonesia teeter between the largest and second largest in the world: generating USD 18 billion per year.[47] On a year by year basis, the expenditures associated with respiratory diseases, per the aforementioned projection, is around USD 44 billion per year–exemplifying that healthcare costs associated with air pollution greatly outweigh the revenue coal produces coal. However, the argument is not that simple. Stopping coal production means the immediate loss of that USD 18 billion revenue to the nation and the loss of the nation's most critical resource for electrification. Consequently, we need to show that a replacement is feasible in terms of electrification and has economic benefits.

[45] See Greenstone, et al.
[46] See Bloom, et al.
[47] See Schneider for export revenues of coal

As renewable energies become more readily available, we see that they are not only a less pollutive energy alternative, but that implementing them has long term economic benefits. Our aim here is to compare the cost of electrifying the country with coal in comparison to renewables, and the picture is promising: in 2016, the average cost of generating electricity in Indonesia was USD 75 per MWh.[48] Note, that in 2016 coal made up 54% of the electricity generation by source, whereas renewables comprised less than 12%.[49] This, and the fact that non-renewables comprised roughly 88% of the electrification energy sources, shows that the comparatively high electrification cost in Indonesia was driven by expensive fossil-fuels.

Now, the cost of electrifying a country through renewables proves to be comparatively less expensive in the case studies of India and Mexico: in India, recent solar projects sell electricity at USD 40 MWh, and Mexico sold at an even lower price of USD 21 per MWh.[50] These comparatively lower prices than that of which the Indonesian government pays for electricity production exemplify that renewables are a better alternative from the production based economic argument. Furthermore, the benefits associated with renewable utilization would drastically reduce harmful pollutants, serving to diminish the negative externalities of surmounting healthcare costs that come with coal production.

External Institutions Funding Sustainable Developments

The Indonesian government has adopted some policies advocating a transition to renewables. The most prominent policies were outlined in the *First Nationally Determined Contribution: Republic of Indonesia*, which is a document (NDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) outlining the nation's

[48] See Ministry of Energy and Renewable Resources
[49] See OECD Environmental Setting, specifically refer to the graph titled "Electricity generation by source, 2005-16" on p. 7
[50] See Safi, M. 2017 for prices on India & Frankfurt School UNEP Centre for prices on Mexico

commitment for a transition to a low-carbon and climate resilient future.[51] The motivation for the document is two-fold: first, an acknowledgement of Indonesia's pivotal geographic position and global connection to the world's health;[52] second, conditional and unconditional commitments act as proposed environmental metrics to attract exterior institutional funding.

This marks a transitional point in our chapter to explore proposed policies from the Indonesian government in combatting climate change. Furthermore, we will explore the effectiveness of these proposed policies, their complications, and ask whether and it is in the government's best interest to meet their benchmarks to receive exterior institutional support from the REDD+ (Reducing Emissions from Deforestation and forest Degradation) organization.

Indonesia's NDC serves as a document outlining the nation's commitments to reducing their greenhouse gas emissions. It includes commitments about energy use, land rights, and more robust emission testing systems. The general commitments proposed under the Regulation No. 79/2014 on National Energy Policy offer a broad picture into the country's current energy utilization and how they envision future change. The regulation states four commitments:

1. "new and renewable energy at least 23% in 2025 and at least 31% in 2050
2. oil should be less than 25% in 2025 and less than 20% in 2050
3. coal should be minimum 30% in 2025 and minimum 25% in 2050
4. gas should be minimum 22% in 2025 and minimum 24% in 2050"[53]

[51] See First Nationally Determined Contribution: Republic of Indonesia, specifically 1. National Context

[52] Ibid. Specifically refer to 1. National Context that describes the importance of Indonesia to the Earth's greater health: "Given its pivotal geographic position in the global ocean conveyor belt (thermohaline circulation), the largest archipelagic country and its extensive tropical rainforests with high biodiversity, high carbon stock values and energy and mineral resources, Indonesia is recognized its role to play in combatting global climate change."

[53] See NDC from Indonesia, p. 3

Meeting these goals, particularly number 1, seems ambitious considering the current use of modern renewable energy stands below 10% of the nation's primary energy supply.[54] Meeting these energy requirements will undoubtedly require significant modifications to the nation's current energy consumption levels. The point of the NDC, however, is not just to outline the nation's interior goals surrounding emission reductions, but rather to develop an incentive structure for both Indonesia and exterior institutions: that is, to provide metrics for Indonesia to meet independently, and to show that if those are met with success then exterior institutional support could propel Indonesia further towards sustainability.

The incentives to truly modify energy use and promote sustainable practices may be seen in the conditional versus unconditional sections of the document. They define their commitments to reducing greenhouse gas emissions under two scenarios: first the unconditional reduction states, "Indonesia has voluntarily committed to reduce unconditionally 29% of its greenhouse gases against the business as usual scenario by the year 2030."[55] The unconditional reduction assumes no exterior support, whereas the more ambitious conditional projection of reducing emissions by 41% over the same time frame states that such is subject to availability of international support for finance, technology transfer and development and capacity building."[56] Ultimately, the capacity of Indonesia to significantly reduce their emissions relies on external support from organizations such as REDD+. It seems that with proper governmental coordination Indonesia would greatly benefit from meeting their established benchmarks to receive additional funding. However, this side of the situation only considers the success of Indonesia as something defined by geopolitical statistics. The other side of the situation

[54] See OECD, Environmental Setting, specifically p. 6 section 1.3 under "Energy Mix"
[55] See NDC from Indonesia, p. 7
[56] Ibid.

considers local populations. It would be amiss for us to not consider the effects of this international support from a national to local level. Naturally, we must ask, what are the terms for Indonesia to receive such support and what challenges arise from these aims to curb emissions?

REDD+ financing can generally be understood from The Warsawa Framework, which states that financing of developing countries will occur through three phases: 1) readiness; 2) demonstration activities; and 3) results-based action.[57] Thus far, in the Indonesian case, there still exists a variety of challenges associated with REDD+ implementation. First, exterior support from organizations like REDD+ inherently comes with externality of compromising local communities. Specifically, Enrici and Hubacek observed that it is possible that "REDD+ could cause recent movements toward decentralized forest management to shift back toward more centralized forest management, to the detriment of communities and forests."[58] This poses the threat of seriously disenfranchising local communities and their existing interests. Second, political stability and robustness are necessary for the proper integration of exterior funding sources. Currently, Indonesia faces the following obstacles in their path of implementing REDD+: lacking bureaucratic coordination, policy ineffectiveness, overpowering private sector interests and weak law enforcement.[59] These challenges, in combination, develop a serious worry about how funding will be distributed throughout the country. Particularly, will national interests trump that of local communities?

These challenges cause funding hesitancy and is most probably why the REDD+ organized deal between Norway and Indonesia has taken so long to materialize. Conversations

[57] See Turnhout et al., 2017
[58] See Enrici et al., specifically p. 12 under "Conclusions and Discussion"
[59] See Cifor for an analysis of REDD+ Policy challenges in Indonesia

between the two countries were introduced more than a decade ago where the respective parties signed an agreement acknowledging financial support were Indonesia to demonstrate effectiveness at preserving rainforests and curbing emissions; the deal, which agreed to the payment of USD 1 billion to Indonesia, was signed in 2010 yet has not seen any sort of material action until recently.[60]

This funding seems to be a double-edged sword: its benefits include the possibility for Indonesia to improve its international image through decreased emissions and reforestation efforts; however, the threat stems from the looming prospect of disenfranchising local communities. Frances Seymour, a distinguished fellow of the World Resources Institute, notes that deals like this and REDD+ engagement with Indonesia offer five critical benefits: one of which is the possibility for Indonesia to cease the position Brazil was in a few years ago as the poster child of deforestation improvement; with additional funding they could, theoretically, show considerable emission decreases, boast such at the UN Secretary General's Climate Summit, which could, in turn, lead to more funding opportunities.[61] This, however, leads us right into questioning if the sharp and dangerous side of the sword will slash: the Brazilian regime under Bolsonaro led to an uptick in deforestation rates over the past few years and a plethora of other corruption issues.[62] Thus, we need not ask if these international financing opportunities are in the national government's best interest (because they clearly are), but rather, how significantly will the interests of sub-national and local populations be compromised by international support?

The implementation of REDD+ and other conservation programs at either local, sub-national, or national level needs to be a critical consideration when distributing this aid. In Enrici

[60] See Jong
[61] See Seymour
[62] Ibid.

and Hubacek's research about the challenges posed by REDD+ programs in Indonesia, they conclude that the eventual effects of these programs are uncertain because of the variation in which they are implemented: they specifically state that "[i]t is possible that REDD+ could cause recent movements toward decentralized forest management to shift back toward more centralized forest management, to the detriment of communities and forests."[63] On the other hand, the opposite is possible "that REDD+ is offering an opportunity to shift that form of decentralized forest management, not into recentralized forest management, but into project-level forest governance."[64] The uncertainty surrounding this funding proves extremely complicated from both the Indonesian–from a national to local level–and external perspective.

From a geopolitical perspective, the answer seems to be obvious: more money from external institutions would help Indonesia become more sustainable. As we exemplified in Chapter 2 and in earlier parts of this chapter, a transition to sustainable practices proves to be in the governments best interest to maintain tourism attraction and decrease electrification prices and healthcare costs. However, the disenfranchisement of local populations seems to be a key worry during the acceptance and implementation of internationally guided sustainability programs. Thus, we cannot conclude whether external financial support proves to be an overall good for Indonesia's fight for sustainability. However, we can conclude that sustainable developments in the nation need to acknowledge the established philosophies of local populations and to integrate themselves with existing cultures: that is the central aim of our co-living vision.

[63] See Enrici et al., specifically p. 12 under "Conclusions and Discussion"
[64] Ibid.

Chapter 4: A Comparative Analysis of Co-Living Spaces

This chapter marks a stark transition from a focus on the Indonesian government to a discussion of contemporary living styles. Now that we have outlined the necessity for Indonesia to change its energy consumption practices, it is time to begin our proposal for how they may begin to do so. Please bear in mind that, by no means, do we expect our proposition to be an overwhelming solution to Indonesia's high emissions and the problems associated with the national government's circumnavigation of indigenous interests. However, our proposition does serve as an example of one way in which Indonesia, and the world at large, may begin a transition to sustainable development practices and simultaneously prioritize community interests. As we described in the final section of Chapter 2, we cannot feasibly expect Indonesia to make a paradigmatic transition to sustainability, so we must rely on incremental improvements. That, in and of itself, is how we should read this chapter and the next: an incremental improvement for sustainability and community that aligns with broader trends.

We outlined that tourism is increasing within Indonesia, and it is in the country's best interest to foster its growth. However, we also showed that this development comes with the compromise of local community rights. Now, we will begin our discussion of co-living spaces with the hope that our vision may be an option that humbly promotes sustainable development and the respect of indigenous peoples in Indonesia's industrialization of its "10 New Balis."

To provide a framework for this idea, we will begin this chapter by describing contemporary norms and preferences among younger generations that align with the co-living philosophy. In doing such, we will discuss decreasing homeownership among younger generations and the trend of urbanization replacing suburbanization. Then we will transition to a discussion of travel motivations among this younger generation and broader trends toward

nomadic styles of living–particularly that of the digital nomad. Finally, this chapter will conclude with a description and comparative analysis of three different co-living companies: Roam, Outsite, and Comunita. The purpose of such is to show the existing philosophies of co-living spaces and to provide a tangible idea of how they function. In sum, these three different companies exemplify that co-living spaces are becoming increasingly prevalent on a global scale; however, no one company has perfected the space nor successfully incorporated significant sustainable design practices into their model.

Economic and Cultural Shifts Among Younger Generations Driving Nomadic Living

The homeownership rate has been steadily decreasing for the age range 25-34 over the past decade and a half: in 2005, more than 46% of American individuals in this age group owned homes; that percentage has been steadily decreasing, where in 2017 that number stood at 38%.[65] In an interview and analysis with the Urban Institute, Annie Nova discusses the primary reasons that homeownership is decreasing among younger generations. The overarching drivers are twofold: the first stems from economics and the second from culture-based shifts. The Great Recession undoubtedly sits at the root of this trend and very well can make it be understood as a forced transition because of financials rather than a chosen one because of a growing nomadic culture. However, there is no denying that both components are at play in driving this shift away from homeownership. So, we will discuss both and show how co-living places serve as an apt replacement for homeownership from both a cultural and economic standpoint.

The specific economics behind the decrease of homeownership stem from perceptions of rent affordability, childcare costs and student debt accumulation. A recent survey from Freddie Mac exposes the reasons younger generations are less likely to own a home. It all starts with the

[65] See Choi, J. (n.d.)

perception of affordability: they found that 82% of renters view renting as more affordable than homeownership.[66] Combining this thought process with the fact that homeownership is decreasing exemplifies the sentiment that renting is becoming the preferable housing option. So, what drives this thinking? An overall fear of not being able to afford a mortgage, down payment, or other homeowner's expenses because of the increasing costs of student debt: in the same survey they found that half of workers in the essential workforce make housing decisions based on student loan repayment.[67] To further concretize this point, the Urban Institute found that "[i]f a person's education debt went from $50,000 to $100,000, their chance of homeownership declined by 15 percentage points."[68] The economic thought process clearly shows that American citizens find renting to be a more logical option than owning a home.

Now our discussion will shift towards outlining some of the cultural drivers that are causing this downward trend in homeownership. For the purpose of our argument, we will focus on marriage and a migration to urban environments as two of the most influent variables. Following this discussion, we will then transition into in an analysis of the cultural factors driving the increase in nomadic living styles: that is, how younger generations are more likely to travel, move to different locations, and live a generally transient life motivated by experience rather than the accumulation of materials.

Marriage is a critical component driving the shift in homeownership. On the one hand, the Urban Institute found that Marriage increases the likelihood of owning a home by 18 percentage points.[69] On the other hand, the fact that marriages are happening later and are less likely to occur at all offers a key cultural explanation to decreasing homeownership. Our younger

[66] Freddie Mac, Consumer Research Group. (2019)
[67] Ibid.
[68] Nova, A. (2019)
[69] Ibid.

generations clearly do not prioritize wedlock like their parents and grandparents: in 1960, the median age for a first marriage for both men and women were in the early twenties, whereas contemporary medians are closer to age 30.[70] Furthermore, The Pew Research Center found that "Millennials today are more than three times as likely to have never married as Silents were when they were young."[71] The trend away from marriage offers an explanation to how younger generations are settling down later.

The second critical discrepancy between young adults and the generations before them comes with the urbanization over suburbanization.

This is an exemplification of the growing priority of individuality, which in turn increases their propensity to travel and live nomadically. A study lead by researchers at the Georgia Institute of Technology and the University of Illinois found that both "Generation Xers and Millennials were more likely to net migrate into central locations and less aversive to high density at their young ages than late boomers were in the 1980s."[72] In layman's terms, their study found that younger generations are increasingly likely to move to urban areas than Baby Boomers.

This demographic transition accentuates two critical points: first, homeownership is harder to achieve for these younger generations because real estate prices are universally higher in urban centers like New York and San Francisco: in fact, "nearly half of households headed by people ages 18-34 are rent-burdened, meaning that more than 30% of their paycheck goes to their landlord."[73] The consequences of this are weak savings accounts. These younger

[70] See Cohn, D. V. (2019)
[71] See Fry, R. et al., (2018)
[72] See Lee, Y. et al., (2019). p. 538
[73] See Nova, A. (2019)

generations flocking to cities do not have the means necessary to purchase a home early in life because their wealth accumulation occurs at a slower pace.

The second point that necessitates discussion asks, why these younger generations flock to urban centers? The overarching reasons stem from the increasing prioritization of education and the capacity to have a plethora of activities in close proximity. The education-based trend stems from the fact that we, as a younger society, are restructuring long-term economic trends around a knowledge-based economy that offers significantly greater returns to educational attainment.[74] Since the value of education has become greater among younger generations, so has the value of being surrounded by external educational opportunities. Per this line of thinking, cities ought to be thought of as environments constantly radiating diverse opportunities, thoughts, experiences, and, most importantly, innovation. Living in a city provides the generation prioritizing education a plethora of positive externalities that cannot be quantified with currency but rather experience. These can also be thought of as "consumption amenities such as shopping, social, cultural and recreational opportunities."[75] Ultimately, this desire to be at the cultural and societal forefront, which urban centers epitomize, simply means being where the new food fad incorporating wheat grass and kale into every meal is to having world class museums, galleries, and theatres just a few stops away on the metro.

Now that we have analyzed why homeownership is decreasing and underpinned the rationale behind urbanization, it is time to explore the cultural drivers of nomadic living. That is, why are younger generations showing greater interests in moving and traveling throughout their life? This discussion serves as a direct precursor to our subsequent discussion of co-living

[74] See Lee Y. et al., (2019), p. 540
[75] Ibid.

spaces. Once we have established the growing trend of travel and living nomadically, we will be able to legitimize the co-living sector as an area poised for expansion.

Globalization and the ease of contemporary travel are arguably the most obvious and important points in explaining growing travel interests. Furthermore, as the world becomes more globally connected, so does each new generation. In an AARP study about 2018 plans and motivations for different generations to travel, they uncovered that Millennials are significantly more likely to travel than Baby Boomers; also, they found that Millennials' motivations for travel align much more closely with exploration and adventure.[76] First, millennials plan to take roughly 73% more international trips than boomers; second, Millennials are comparatively more likely than boomers to travel for adventure, to try something new, or to commit to health improvements as they make travel plans.[77] Ultimately, Millennials are more likely to travel and are more interested in engaging with experienced based traveling. Furthermore, the point about commitments to health improvements in regard to improving a travel experience truly accentuates the increased dedication and prioritization to making the most of travel.

Now, we must prove the trend of global digital nomadism to legitimize the feasibility of coliving spaces. This proves to be a relatively simple task that does not require much discussion. Let us begin with the mere fact that digital nomad is now a term, whereas that was not the case a couple decades ago. However, we will outline some of the demographic statistics in about digital nomadism to prove its increasing prevalence as a viable career path: first, consider that 4.8 million American described themselves in 2018 as a digital nomad, which is actually 2.4% of the United States Labor Force.[78] To put this in perspective, consider that in 2018, the entire Federal

[76] See Gelfeld, V. (2017), p. 6
[77] Ibid.
[78] See Pofeldt, E. (2018) & Labor Force Statistics

Government only comprised 1.7% of the total U.S. labor force.[79] Clearly digital nomadism is a contemporarily relevant description for a significant portion of American workers. Furthermore, a research brief from MBO Partners State of Independence found that 27% of traditional U.S. workers said they might become digital nomads in the next two to three years, and 11% percent answered that they confidently planned to.[80] The growth of this trend necessitates a modification to the existing housing market.

Comparative Analysis of Coliving Spaces

Now that we have proven the growing interest in travel and nomadic styles of living, we will dive into a comparative analysis of three different coliving spaces. We first will analyze Comunita because it is one of the only coliving companies that exists with an active mission prioritizing sustainable development. Second, and final, we will conclude the chapter with a thorough description of Outsite and Roam and discuss which one presents greater opportunity for success from an economic standpoint. The key purpose of this section is to answer the following two questions: Why are coliving spaces becoming an attractive living option? And, what are the comparative advantages from company to company? Finally, this section serves to lead us into Chapter 5, where we will discuss our unique carbon-neutral coliving vision.

Comunita

Comunita is one of the only coliving companies worldwide that has adopted the vision of combining sustainable development with a coliving subscription style. They have not launched any location at the moment but note that they are planning to open a coliving space in 2020.[81] This shows that the ideas of sustainable development combined with coliving have not been

[79] See Employment by Major Sector. (2019)
[80] See Pofeldt, E. (2018)
[81] See Comunita (n.d.), this is the webpage of Comunita and the relevant information can be found in the FAQ section

actualized but are on the cusp of materialization. The company is based in Auckland, New Zealand, which is no surprise considering the innovation in sustainability coming out of the country. Because Comunita has not launched any locations thus far, our discussion of them will focus entirely on their philosophy. This philosophy focuses itself around sustainability, community, functioning systems, and financial attractiveness, which acts as an appropriate model for understanding two critical connections between our governmental and demographic discussions with that of coliving spaces: first, their philosophy prioritizes awareness which connects to existing disenfranchisement issues with local populations in Indonesia.[82] Second, their positive prioritization of community connects with the increasing value placed on education with today's younger generations: specifically, how community provides a plethora of positive externalities for ideational purposes.

Comunita, most fundamentally, prioritizes having people around people. They take an approach that believes community ousts individuality. This African Proverb so appropriately describes their vision: "If you want to go quickly, go alone. If you want to go far, go together." Comunita advocates a holistic style of living that encourages people to collaborate on a vast spectrum: from working, to cooking, to sharing a beer, they believe inspiration is much more prevalent with the presence of others.

In a Medium article Comunita published, they describe the necessary ingredients for developing a community that is more than one where people just cohabitate, but rather harmonize. Three of their foundational pillars are participation, which then must lead to the development of positive community-based relationships, which, in turn, is held together by empathy.[83] These three elements of a positive community are what Comunita believes drives

[82] Ibid., specifically navigate to About Us
[83] See Comunita. (2019)

meaningful community-based relationships, self-improvement and wellbeing of those staying at their space. So how does Comunita plan to do this? They plan to utilize a built environment that promotes positive community-based living and sustainable practices.[84] This is exemplified by their universal design vision: "Comunita is based on micro apartments where each resident has their own private room which is connected to a larger community area with a large shared kitchen, living room and play/relax areas which we refer to as a Home."[85] The extent to which we can analyze Comunita ends here because of them still being in early development stages. However, take note of their philosophies about community–as that connects directly to changes in the value of education in younger generations–and sustainable development.

Outsite and Roam

Outsite is a rather large coliving company with spaces in sixteen locations, eight within the United States and eight in international locations. The interesting part about Outsite is that their service combines the capacity to utilize a single housing contract to act as your work home or an indulgent vacation escape. This means their locations vary from New York City and San Francisco to Ericeira, Portugal and Bali, Indonesia.[86] Another key aim of Outsite is to establish an ease of traveling from location to location without having the typical travel hassle of getting settled in a new home. All of their locations share universal amenities: fully equipped kitchens, bedrooms–which they describe as having "cozy beds and linens"–bathrooms with supplied towels and toiletries, laundry facilities, and weekly cleanings.[87]

Outsite also incorporates unique coworking options to their portfolio, which critically distinguishes them from other coliving companies. Specifically, what they call "Outsite for

[84] See Comunita. (n.d.), navigate to "About Us" and find "The pillars of our Manifesto"
[85] Ibid. the applicable quotation can be found under "Our Vision" on the "Home" page
[86] See Outsite. (n.d.), specifically navigate to "Locations" tab
[87] Ibid., specifically navigate to "Coliving" tab

Teams": team specific coworking retreats that's purpose is to offer business teams the capacity to go live together, work together, and develop their ideas in a catered environment.[88] Outsite states that this service is extremely flexible, as it can be customized "from DIY to full service."[89] The full service options come with the following options: your choice between a personal chef or catering, whether you would like to give Outsite the responsibility of organizing a schedule that integrates team building activities and workshops, and finally the option to receive tailored education about the local environment outside the coliving space.[90] This option definitely differentiates Outsite in their offerings oriented around professional growth. They essentially take care of the team's basic needs so that higher level growth can be achieved–somewhat actualizing Maslows Hierarchy model in the coworking sphere.

In regard to pricing, they have two offerings: a subscription-based model for members and a no-barrier Airbnb style booking for nonmembers. The price for a yearly membership is $249 annually and comes with typical commercial oriented promotions: such as "access to a private Slack channel full. . .discounts on curated lifestyle and business benefits. . .up to 50% off stays at Outsite Coliving. . .priority access" and a credit rewards system."[91] These benefits align perfectly with subscription based marketing jargon, but they seem effective. In 2018 they had 500 members, and as the housing trend with younger generations moves away from ownership, they hope to capitalize further on enrollment figures.[92]

Roam's philosophy and design is similar to that of Outsite: they are both international networks of co-living spaces. The similarity between the two extends to their philosophies as

[88] Ibid., specifically navigate to "For Teams" tab
[89] Ibid.
[90] Ibid.
[91] Ibid., navigate to "Become a member"
[92] See Stolzoff, S.

well. Like Outsite, Roam highlights its priorities as comfort, community and productivity.[93] Where Roam differentiates itself from Outsite is in the level of privacy guaranteed in the room paid for: Roam defines comfort as having a private bathroom and a room guaranteed with a fully furnished queen or king-sized bed.[94] In contrast, Outsite does not always guarantee a private bathroom. And as we all know, private bathrooms can be a serious step up in terms of luxury and may be the distinguishing variable between hostel living versus that of a classy hotel style.

Prices between Outsite and Roam are fairly similar: staying in San Francisco will cost just north of $1,000 a week for both companies and for other locations, say Bali, those prices are adjusted to around $400.[95] For Roam, the prices per month range from $1,800 to $4,200 depending on location.[96] Considering this includes a yoga space, frequent cleaning services, a private room and bathroom, access to office spaces, and all basic utility needs (including Wi-Fi), that seems like an extremely fair offer.[97] These prices do compare to luxurious private living quarters in San Francisco, Tokyo, and Bali, and on top of that, they do not lock renters into fixed long-term agreements.[98]

The subscription service offered by Roam, called Flex, exemplifies where the world of coliving is going for people wanting to travel: go from location to location with the furnished amenities of home awaiting you. Also, do not worry about the red-tape hassle associated with organizing a new housing contract–whether that be 30 minutes to book an Airbnb for a trip or days to organize a short–term housing lease for a few months in a new location. There are three different levels to Flex: first, Official Flex Member; second, Gold Flex Member; third, Platinum

[93] See Roam. (n.d.), specifically navigate to "Home"
[94] Ibid.
[95] See Roam. (n.d.) and Outsite. (n.d.), specifically navigate to their respective booking sections
[96] See Roam. (n.d.), specifically F.A.Q.
[97] Ibid.
[98] Note that the average rent in the San Francisco rental market is $3,629 per month, where 1-bedroom apartments are closest to the average apartment style (refer to San Francisco, CA Rental Market Trends.)

Flex Member.[99] These different levels offer member benefits of priority booking, pricing breaks, and credits; now, how one becomes a member requires a larger financial commitment than Outsite of $3,500.[100] However, that money does not sink into just a membership, it goes into a Roam credit account that is used to pay for future prorated stays.[101]

Roam's subscription service appears to be a better option for both the company and consumer. This, of course, is under the assumption that a client enrolling in either of these services has $3,500 to spend upfront. Outsite does not, in fact, require that much capital up front, considering their membership enrollment is only $249 annually; however, if Outsite is the service we choose, and you want to stay in San Francisco with a private bathroom (which equates to Roam's standards). Then, you would need to have a minimum of $2,604, excluding the membership fee.[102] Now, from the business side of things, Roam seems to be in much higher demand than Outsite: when I tried to check the prices of locations in San Francisco on the Roam website, their first available move-in date was December (it's currently May).[103] Whereas, with Outsite, they had the option for me to move in tomorrow.

The $3,500, then, proves to be an economic obligation for Roam customers and has resulted in 100% filled demand for upcoming months. Additionally, from the customer's perspective, once that $3,500 is in your Roam credit account, it is not waisted as a sunk subscription fee because 100% of it goes directly towards your rental payments, essentially unlocking benefits of the three-tiered Flex program for "free." In conclusion, the subscription-

[99] Ibid., navigate to "Flex"
[100] Ibid.
[101] Ibid.
[102] See Outsite. (n.d.), specifically for a booking in the Mission location from May 11 – June 11, 2020.
[103] Note that Outsite does have more locations than Roam at the moment

based model of Roam Flex appears to be more effective at incentivizing customers to book stays, which, in turn, successful fills demand at Roam coliving spaces.

In sum, the comparison between Roam and Outsite underpins the fact that coliving spaces provide flexible housing options that make economic sense from a renter's perspective. Furthermore, the philosophies of all three coliving companies point to the imminent integration between living, education, and work. Similar to our discussion about urbanization, these coliving spaces provide the unparalleled opportunity to have the cultural and intellectual opportunities in close proximity. Such will be a critical focus in the next chapter as we develop our coliving vision. Like Roam and Outsite, we will try to market ourselves to a relatively universal audience, be that a stationary worker in NYC to a digital nomad. On the other hand, we aim to establish a sustainable identity that will inevitably be shared by our client base. We will use the analysis of this chapter in establishing our coliving space's most important characteristics.

Chapter 5: Our Sustainably Developed Coliving Vision

This chapter will directly explore what a sustainable coliving space in Indonesia looks like. That is, we will dive into the best materials to be used to minimize our carbon footprint while also ensuring functionality. This means sourcing local materials (such as bamboo and coconut husks) and designing the energy system with Indonesian natural resources in mind. Throughout this chapter, we will explore the combination of functionality, sustainability, the built environment and classical Indonesian architectural philosophy to define our vision. Particularly, the chapter will divide itself into three sub-sections: first, an overview of the primary areas of a building aiming to achieve carbon neutrality; second, we will explore the history of Balinese architectural philosophy to ensure our design outline offers a framework for how to incorporate the history of Indonesian building practices with modern sustainability techniques; third, we will describe our vision and philosophy for the space.

The first section of this chapter will dedicate itself to thoroughly outlining the components of a sustainably developed building. Throughout this discussion, we will provide a general recommendation and outline for how a sustainable building ought to be constructed in Indonesia with passive design strategies in mind. Rather than offering a hyper-specific location-based property proposal, we will provide a broad overview of passive design strategies in equatorial-tropical climates so that our design could hypothetically be applied to variety of locations within Indonesia. We will address orientation, ventilation, thermal mass, insulation, lighting–in the form of windows and other natural lighting techniques–and on-stie renewable energies in developing a framework for the sustainable Indonesian coliving space. We cannot offer exact numbers in terms of building volume, angle of shading apparatuses, and size of lighting instruments because we are not developing a building for a chosen location in Indonesia.

Consequently, our discussion of these passive design strategy variables will offer as detailed of descriptions possible for the purpose of providing an outline for a passive design layout in a hot-humid-equatorial-tropical climate.

Sustainable Development and Carbon Neutrality

To begin our segment about what a carbon neutral building consists of, it seems appropriate to first accentuate the necessity of carbon neutral building development. Again, our intention in this paper is not to rant about global warming and the decline of natural resources, but rather to present an optimistic view of what can be done to promote sustainability. So, the reason we are proposing carbon neutral building is because of its growing importance: our global population is increasing at a rate where 1.5 million people are being added to the world's cities every week.[104] Consequently, it is estimated that accommodating these new city-dwellers will require a new 2.5 trillion square feet of buildings by 2060.[105] To put this in perspective, "that's the equivalent of building an entire New York City every 34 days for the next 40 years."[106] If we assume this trend will continue, or even at a significantly lower rate, the necessity for sustainable development is apparent and necessary.

Developing carbon neutral buildings is essential, so this section will devote itself to explaining what carbon neutral construction consists of, an overview of what that looks like in Indonesia, and, why it is not only feasible, but rather a simple alternative to classic construction.

Light House, a leading sustainable building society in Vancouver, defines a carbon neutral building "as one with significantly reduced energy consumption combined with the increased use of low carbon energy sources to meet the remaining demand" (Light House, 2012).

[104] See Mazur, L. (2018)
[105] Ibid.
[106] Ibid.

Essentially, this means that carbon neutral buildings demand significantly less energy resources in comparison to typical buildings. Additionally, they utilize green energy sources with low carbon demand to meet energy needs.

Designing a building like such may encompass a variety of carbon reduction practices. For the purpose of our exploration into carbon neutral buildings, we will explore some fundamental elements for carbon neutral building practices and then extrapolate those to the Indonesian environment. Helen Carruthers, a LEED AP, describes those key elements of carbon neutral buildings:

1. Integrative passive design strategies
2. Designing a high-performance building envelope
3. Specifying energy efficient HVAC systems
4. Installing on-site renewable energy[107]

These five components are broad design strategies that can be widely applied, ranging from industrial to household building types. Defining each of these parts in greater detail will give us a comprehensive understanding of what a carbon neutral building ought to consist of, at a fundamental level. Then, we will have a foundational understanding that will ease the process of describing what the key elements are for developing our carbon neutral coliving space in Indonesia.

Integrative Passive Design

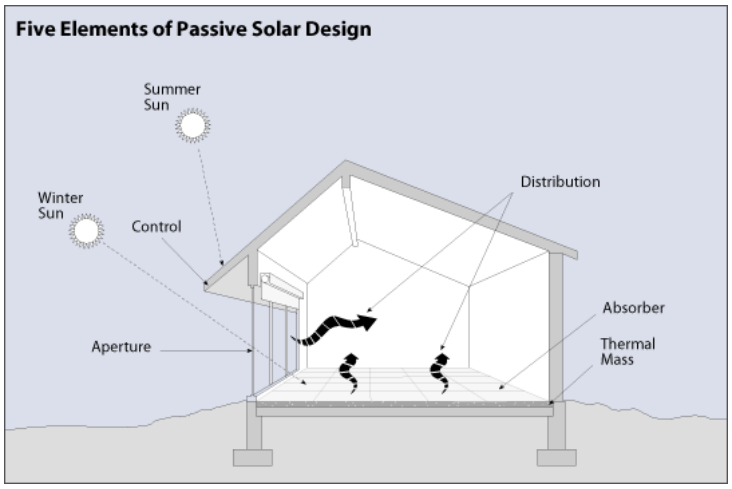
First, integrative passive design strategies utilize local climate conditions and building property conditions to create natural heating, lighting, and airflow systems. Level, a sustainable building organization from New Zealand describes the key elements of passive design as

[107] See Carruthers, H. et al., (2013), p. 1

"building location and orientation on the site; building layout; window design; insulation (including window insulation); thermal mass; shading; and ventilation."[108] In sum, these strategies aim to make a building naturally insulated, lit and ventilated. The positives of integrative passive design strategies stem from the fact that they do not require advanced sustainability techniques to implement, and that they cost little or nothing to implement in a new or existing building.[109]

In application, what does integrative passive design look like? For solar access, the design focuses on "a combination of location and orientation, room layout, window design and shading" to give a building warmth in cooler winter months while avoiding overheating in the summer.[110] This process specifically addresses which direction the largest light collecting sides of a building will face; in other words, where are the largest windows, how large are they, and what shading techniques are implemented? The building ought to face its side intending to collect light in a southward direction. Then, window size and shading ought to be dictated by the angle of the summer and winter sun for the particular building site. The following diagram provides a useful illustration of such:

[108] See Passive Design. (2020)
[109] Ibid.
[110] Ibid.



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As illustrated above, it is clear that developing a simple shading technique helps maintain building temperature throughout the seasons by moderating the exposure of natural light. Ultimately, the sun is an extremely important energy source for most climates: that is why, arguably, the most important and widely used passive design strategy is solar. Properly utilizing this system extends past lighting and into heating for a building.

A properly designed passive solar system utilizes insulation and thermal mass to take the suns radiant energy and reflect it or store it to create a comfortable environment within the building. Both of these components hinge on the use of proper materials. Insulation works to maintain the temperature within a building, whether that be keeping the cold of winter or the heat of summer out. Furthermore, insulation serves to keep the temperature within a building constant by holding the tempered air inside. The proper utilization of insulation combined with proper sun exposure and shading techniques creates a building that requires significantly less greenhouse gas emissions. Primarily, because such a building has a decreased reliance on heating and cooling systems.

Thermal mass is the final component of the passive solar design process: it acts like a rock baking in the sun all day, where if you were to lay on it, you would feel a comfortable warmth emit from it. Thermal mass critically differs from insulation in that its purpose is to capture radiant heat from the sun and slowly emit it back into the building. This design technique relies on the science of thermodynamics, that is, thermal mass "reduces temperature fluctuations by absorbing heat when the ambient temperature is hotter than the mass, and then releasing the heat when the ambient temperature falls below the temperature of the mass."[111] The diagram above provides a good picture of how thermal mass incorporates itself into passive solar design: typically, it first absorbs energy from the sun and later emits it to the building upon cooling interior air temperatures.

Insulation and thermal mass, together, capitalize on proper building orientation and shading techniques to maintain building temperatures. We outlined how these two techniques work to maintain a consistent interior temperature, however, it is critically important to distinguish how the two operate in distinguishable fashions. Examples of thermal mass include water and concrete; these are materials described as 'high thermal mass' which can be simply understood as materials having a great capacity to store heat.[112] Insulation, in contrast, is low thermal mass as it ought to reflect heat for the purpose of differentiating interior temperatures from the exterior of a building.[113]

The final variable we will define in our exploration of integrative passive design is ventilation. Passive, or naturally occurring, ventilation successfully occurs "when air is exchanged in a building through openings in the building envelope using the stack and wind

[111] See Thermal mass and Designing for Heating and Cooling. (2018)
[112] See Thermal mass. (n.d.)
[113] Ibid. navigate to "Building Physics and insulation materials" tab for greater detail

pressures."[114] Ventilation, like the formal passive systems, is used for temperature regulation within the house. However, ventilation serves another key purpose to the comfortability of a building: the removal of pollutants. Proper ventilation serves to diminish moisture and mold buildup along with ridding a building of volatile organic compounds and carbon dioxide.[115] As we will see in our subsequent discussion of the building envelope and the Indonesian sustainable design, tropical climates necessitate the use of ventilation for cooling purposes in warm and moist climates. Consequently, ventilation will be a critical component of our coliving space's passive design strategy.

Passive ventilation comes in two forms: controlled and uncontrolled. The controlled ventilation occurs through purposeful openings in a building's envelope, as in windows, doors, and purpose-built vents; uncontrolled comes from "unintentional openings such as gaps around windows and doors and between building components."[116] The uncontrolled ventilation may be minimal under proper design, thus we can dedicate our focus to controlled ventilation. For our purposes of exploring ventilation in tropical climates, we will focus on passive cooling. This can be accomplished with four steps:

1. Orient the building to maximize exposure to cooling breezes
2. Ensure good airflow paths throughout the building
3. Distribute windows to maximize airflow while minimizing unwanted heat gain
4. Incorporate low level (near the floor) horizontal openings, as this is the most effective design for ventilation purposes[117]

[114] See Passive Design. (2020), specifically the sub-section exploring ventilation techniques
[115] Ibid.
[116] Ibid.
[117] Ibid. See "using passive ventilation for cooling"

The ultimate goal of these ventilation processes is to provide passive cooling for comfortability and evaporative cooling to avoid air toxicity.

High-Performance Building Envelope

The building envelope may simply be understood as the façade of a building; with the integration of sustainability, this component becomes more complicated than mere aesthetics. A high-performance building envelope, or façade, is sustainable and overarchingly aims to be an exterior enclosure using the "least possible amount of energy to maintain a comfortable living environment."[118] Aksamija, a specialist in LEED building, accentuates that, most importantly, "they are building systems that create comfortable spaces by actively responding to the building's external environment, and significantly reduce buildings' energy consumption."[119] Such is accomplished by developing the building envelope with direct regard for the environment it will reside in. Specifically, is the environment temperate, hot and humid, or cold throughout the year? Answering this question is critical, because it determines the orientation of the building envelope which further dictates the aforementioned variables that comprise the integrative passive design system.

Since our building will reside in Indonesia, we must acknowledge the tropical, humid, and warm climate in our proposition and definition of an appropriate high-performance building envelope. First, the appropriate building envelope type is defined as one for cooling-dominated climates; that is, it will serve to primarily cool the structure. To accomplish such, four primary environmental areas need be addressed: (1) solar control; (2) reduction of external heat gains; (3)

[118] See Aksamija, specifically p. 1 under Climate Based Design Methods for High-Performance Facades
[119] Ibid. pp. 1-2

cooling; (4) daylight.[120] Aksamija offers a succinct definition of these variables accompanied by guidelines for how they ought to be implemented in cooling-dominated climates:

- Solar control: limiting direct solar heat onto the façade through self-shading methods
- Reduction of external heat gains: utilization of well-insulated opaque façade elements to limit solar heat accumulation
- Cooling: incorporation of natural ventilation
- Daylight: use of natural light sources while minimizing solar heat gain through use of shading devices and light shelves[121]

In conclusion, an effective building envelope in a tropical climate will protect itself from radiant solar heat, utilize insulative materials that reflect heat while minimizing the use of thermal masses, and, finally, incorporate natural ventilation for cooling purposes.

Now that we have developed a general understanding of integrative passive design strategies and how those are actualized with a high-performance building envelope, we may begin to incorporate our overview of sustainable building elements with an application to a tropical climate (i.e., Indonesia).

Energy Efficient HVAC Systems and On-Site Renewable Energy

HVAC, or heating, ventilation, and air conditioning system, are essential in all buildings to maintain optimal temperatures for the purpose of creating a comfortable environment. Developing sustainable systems is an absolute necessity, as commercial and residential buildings consume nearly 40% of the annual US primary energy and 70% of the annual electrical power.[122]

[120] Ibid. p. 2
[121] Ibid. Refer to Table 1: Façade design strategies for different climate types
[122] See Hydes, K. et al., (2013), specifically refer to section "Sustainable Heating Ventilation and Air Conditioning"

This energy drainage from HVAC occurs at similar levels worldwide, thus developing sustainable heating, cooling, and air conditioning systems proves essential.

HVAC is arguably the most complex variable in sustainable development, as there exists a plethora of practices available to address heating, cooling, and ventilation within a building. Consequently, our discussion of HVAC will directly hone into the applicable sources for heating, cooling, and ventilating for a building residing in the tropical environment of Indonesia. Furthermore, sustainable HVAC practices ought to be implemented within buildings only to cover any remaining needs that cannot be met through integrative passive design. Thus, we will define two different renewable energy HVAC systems: first, geothermal for heating and cooling; second, solar air-conditioning for cooling and ventilation.

For our purposes, geothermal energy will come in the form of geothermal heat pumps, which can be defined as systems using "the ground, groundwater, or surface water as a heat-source or sink."[123] These heat pumps are an amazing technology as they can provide heating or cooling systems. Furthermore, from a sustainability perspective, they require 25% to 50% less electricity than conventional heating and cooling systems.[124]

This system comprises itself of three critical components: (1) a ground loop, (2) a heat pump, (3) and an air delivery system: The ground loop is a system of pipes buried in shallow ground near the building: a fluid (typically a mix of water and antifreeze) circulates throughout the pipes to either absorb or release heat within the ground.[125] This system is completely outside of the building. The heat pump connects the exterior ground loop to that of the interior to transfer or remove heat from a building: in colder months, the pump removes heat from the fluid within

[123] Ibid. see Whole Building Design Guide, specifically Introduction
[124] Ibid.
[125] Ibid. Refer specifically to the Description section

the ground loop pipes, "concentrates it and transfers it to the building."[126] In warmer months, the system is simply reversed. Finally, the air delivery system resides within the building to provide direct heating and cooling. This system typically comprises itself of pipes or ductwork that the concentrated liquid from the heat pump may travel throughout in order to maintain temperatures throughout the building.[127]

The applicable construction of a geothermal heat pump system to be used in our respective property is closed loop and one of horizontal configuration.

The second form of on-site renewable energy will come from solar energy. To successfully incorporate this to our coliving space's design strategy, we will need to define what type of solar panel we intend to use and the appropriate tilt angle for Indonesia to extract optimum solar energy.

First, it is critical to understand that there are different types of solar panels that serve different purposes in powering buildings. Photovoltaics generate electricity directly from sunlight through an electronic conversion process, and, then, this energy is utilized for the power of electronic sources throughout a building.[128] There are other types of solar energies that contribute directly to heating and cooling, however we will not discuss those since our incorporation of geothermal energies satisfies that building requirement. We will implement a structure of monocrystalline solar panels rather than polycrystalline because they are comparatively more efficient at capturing solar energy.[129] Second, the Department of Civil and Environmental Engineering at Stanford University performed a worldwide study of optimum photovoltaic tilt angles that makes this portion of the solar energy installation simple for us: their

[126] Ibid.
[127] Ibid.
[128] See About Solar Energy. (n.d.)
[129] See Solar Components 101. (n.d.)

recommendation for Indonesia is 5º to capture the optimum amount of solar energy while providing a tilt angle that naturally utilizes rainwater for cleaning purposes.[130]

In combination, the geothermal solar energy systems of the building will serve to cool and heat and provide electricity to household appliances, respectively, in a sustainable manner.

Balinese Architecture

The diversity of Indonesian cultures makes it impossible to offer a universal solution that would acknowledge historical architectural philosophies for each one of the 6,000 inhabited islands. Consequently, we will explore the Balinese architectural tradition as a means of exemplifying the possibility of incorporating historical tradition with contemporary building techniques. This exercise serves to recognize and respect the local traditions and offer a guiding thought process for the prospective building of sustainable coliving spaces in other parts of Indonesia.

Our sustainable coliving space defines itself as a unique architectural vision through its prioritization of Balinese tradition. Historically, Balinese architectural design served to connect the place where humans reside with nature. Through sustainable practices, we will exemplify ancient Balinese practices of bounding the space on the earth with a paramount orientation to the sacred sky above.[131] Furthermore, our design critically accounts for the later design developments that prioritize the orientation between sky to earth, mountain to sea, and sunrise to sunset.[132] Finally, the design will fundamentally stem from the modern Balinese design philosophies of Tri Mandala and Sanga Mandala.

[130] See Jacobson, M. Z. et al., (2018), p. 58 Table 1
[131] See Aryani, Ni et al., p. 3 and (Raharja, I.G.M., Remawa, A.A.G.R., Cora. T.I.R., 2010)
[132] Ibid. and (Gelebet, I.N., et.all., 1986)

Tri Mandala is the application of Tri Anga in the vertical zoning of one's property: that is, Tri Mandala prioritizes a philosophical and spiritual vision as to how one ought to design a property. The ideal acknowledges three critical components: first, the Utama, which represents the upper hierarchy in terms of what is sacred and related to God; second, the Madya, which represents the middle level of human life; third, the Nista defines itself as the lowest and most profane level where demons reside.[133]

Sanga Mandala applies the principles of Tri Mandala to define how one's property ought to be oriented around and towards surrounding natural spaces. First, sacred and private areas should locate themselves closest to the Kaja (mountains). Second, day-to-day living spaces are expected to lie at the center of a respective property. The third, and final component, advises that the impure or profane areas are located in the direction of the Kelod (sea).[134]

Throughout the design process of a sustainable coliving space in Bali, these aforementioned philosophies are essential to recognize and incorporate. This incorporation shows a general respect for the history of the building's location and an acknowledgement of existing cultural norms. One of the most important components to our carbon neutral coliving vision is the integration between environments outside the space with those inside.

Our Vision

The vision of our coliving space hinges on four pillars: (1) a philosophy prioritizing collaboration; (2) cultural integration with the existing community; (3) sustainability; (4) an acknowledgment of the exterior environment. These four pillars aim to establish our unique

[133] Ibid. and (Lansing, J.S., 1983 and Budihardjo, E., 1985, quoted in Aranha, J., 1991, and Sulistyawati, et.all., 1985)
[134] Ibid.

vision that combines intellectual collaboration, a desire for travel, the prioritization of protecting our planet, and a want to connect with natural world around us.

First, our philosophy prioritizing collaboration will actualize itself in the combination of coliving and coworking environments into one. Of course, office spaces will be distinct from living and relaxation quarters. However, the design of the space intends to harmonize the two areas so that transitioning from one to the other is seamless and a reflection of our support for constant and spontaneous intellectual curiosity.

Second, in establishing a community-based environment prioritizing education and the circulation of ideas, we hope to engage guests with necessary culture norms in a genuine manner. This needs to represent an opportunity where people interact with locals, experience local traditions, and fundamentally engage in casual conversations and day-to-day interactions with the place they are visiting or living in. No traveler or digital nomad who is disinterested in engaging with important cultural practices to playful activities with local communities will be welcome. The point of this is not to be harsh, but rather to foster a community oriented around openness, humility, and a desire to learn something outside of their preexisting worldviews.

Third, sustainability is arguably the most fundamental component to our vision. Ideally, our clientele prioritizes this, or, at least, are open to the experience of being educated about sustainable practices. Our design will utilize the aforementioned passive design strategies, a high-performance building envelope, and on-site renewable energies for the purpose of running as an off-grid site. Our motivation for this is two-fold: first, to disengage with the existing reliance on fossil fuels, and, second, to serve as an example of the feasibility of transitioning to 100% renewables. Sustainable practices are a necessity if we desire to maintain the world we live in, which leads us to our fourth and final point.

Fourth, the acknowledgement of exterior environment necessitates active engagement between clients and workers with the environment surrounding the co-living space. What this tangibly means is connecting with the land through sustainable food sourcing and gardening. Furthermore, as a coliving space we will absolutely provide guests and workers the opportunity to experience the place they are in through natural integration. For Indonesia those activities would be surfing, diving, or hiking which serve a purpose in and of themselves, while intensifying one's acknowledgement about the importance of sustainability practices.

Chapter 6: Conclusion

Our argument began with an analysis of the Indonesian government by showing that it is not only necessary for them to transition to sustainable practices but a logical economic choice. Shifting away from their immense fossil fuel utilization ought to be the most significant and direct means for them to reduce emissions and increase the health of their citizens. However, we outlined that such a shift proves to be a critical challenge because of fundamental reliance on coal for electrifying he country and driving export GDP. Thus, we began our small, locally oriented, recommendation for the implantation of sustainably developed coliving spaces.

These spaces undeniably connect with global trends for digital nomadism. Most importantly, however, our discussion served to underpin the fact that sustainably developed coliving spaces can serve as a model for how the Indonesian government can responsibly industrialize.

Our message is meant to apply to a greater audience than just that of the Indonesian government: our sustainable coliving vision is one that acknowledges macroeconomic trends and a necessity for sustainable responsibility. It is an idea that hypothesizes where younger generations will go and how they will live with extensive global connectedness. It is an idea that takes responsibility for the world we desire to connect with.

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