Rethinking the Climate Crisis Here and Now: Mahāyāna Buddhism, *Engi* Relationality, and the Familiar Pitfalls in Japanese and Taiwanese

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ABSTRACT

Climate inaction occurs partly because the 'problem' is often perceived as spatially and temporally distant. Contemporary Japanese and Taiwanese pro-nuclear energy narratives stress the necessity of nuclear energy for solving carbon emissions and energy security issues (here) and the urgency to retain and/or modernize nuclear power generation capabilities (now), despite its known vulnerability. This article deconstructs nuclear energy as a here-and-now solution to the climate crisis, and it proposes Mahāyāna Buddhism as a means to go beyond the modernist beliefs that gave rise to both the climate crisis and the nuclear energy solution. Drawing on Mahāyāna Buddhist thought where subjects are seen as being generated through relations with others (*engi*) and all beings are inseparable from and *intra*dependent with nature (*eshō-funi*), we argue that the aforementioned narratives offer a false promise to solve the climate crisis. This is because they ignore the relations between current and future generations, and their techno-national, modernist assumptions reproduce human/nature dichotomies.

INTRODUCTION

In the wake of Russia's invasion of Ukraine in 2022, Europe found itself grappling with a deep energy crisis due to the disruption of Russian gas supplies. In the midst of public discussions, nuclear energy made its way back onto the agenda in countries like Germany and Sweden, which had previously worked to close down nuclear power plants (SOLOMON 2022). This process reached its culmination when the EU Parliament moved to back the re-labeling of gas and nuclear energy as green despite internal disagreements (ABNETT 2022).[1] This energy crisis and the ensuing debates reveal two fundamental but potentially contradictory questions in climate change and energy debates: (1) How do we (particularly individuals) minimize our carbon footprint by decreasing energy usage? And (2) how can society protect itself from future energy shortages? The underlying concern here revolves around the fear of scarcity; in other words, it is a concern for ensuring access to energy.

The fear of doing without energy lies at the heart of climate change discourse, particularly in the context of energy security, but rarely have the implications been explored (KESTER 2022). The fear of scarcity in public debates typically takes the form of a concern about a stable supply while the environmental, social, and economic impacts are minimized. While green energy options have gained prominence, public debates reflect a concern that their current capacity falls short of meeting global energy demands. Meanwhile, traditional fossil fuels, despite their association with authoritarian regimes and climate consequences, remain a significant part of the energy mix. It is within this 'energy security dilemma' that nuclear energy made a return to the public debate, as its low carbon footprint was emphasized as the most important characteristic despite other problems such as nuclear waste storage (HIBBS 2022). This is accompanied by a discourse emphasizing individual responsibility in mitigating climate impact, where individuals are increasingly urged to make behavioral changes – namely reduce energy consumption, adopt greener lifestyles, and support renewable energy initiatives (APPELGREN – JÖNSSON 2021: 13; KESSLER – RAU 2022: 59).

Other concerns associated with nuclear energy and climate change appear to become side-lined in the debate. This does not only concern risks involved with storage and disposal of high-level radioactive waste,

but also nuclear power plants' own vulnerability to climate-change-related risks such as typhoons, floods and other extreme weather events (JORDAAN ET AL. 2019). Moreover, operating nuclear power plants might pose harm to other environmental objectives such as *"sustainable use and protection of water and marine resources, pollution prevention and control and the protection and restoration of biodiversity and ecosystems"* (LÜNENBÜRGER ET AL. 2021: 6). In any case, nuclear power plants' vulnerability to climate change should logically raise questions about nuclear energy's purported ability to secure future energy supplies. Yet despite apparent contradictions, nuclear energy sailed up in the debate as the obvious solution to both climate change and energy security. The rise of pro-nuclear energy narratives is discernible not only in Europe, but also in Japan and Taiwan. This is puzzling if we recall that the 2011 Fukushima nuclear disaster was described by Prime Minister Kan Naoto[2] as *"the most severe crisis"* that Japan had faced in the postwar era (JOONGANG ILBO 2011). For people in Taiwan, the island's frequent earthquakes and similar geological conditions mean that what caused the nuclear power plant in Fukushima to release radioactive materials could occur again in relation to any of their operating units. Both countries attempted to significantly reduce their dependence on or gradually phase out nuclear power, as it is vulnerable to devastating catastrophes like that in Fukushima. However, pro-nuclear energy narratives have similarly found their way to the public debate and recently gained political influence in Japan and Taiwan. To what extent does nuclear energy offer a feasible solution to climate and energy crises here and now, as the corresponding Japanese and Taiwanese narratives advocated?

This article investigates what makes it possible to turn a blind eye to the contradictions of nuclear energy in attempts to solve climate and security issues by deconstructing common narratives in nuclear energy debates. We argue that tensions between individual responsibility and anxiety, and the underlying fear of scarcity in energy debates reflect deeper Anthropocene assumptions about humanity's relationship with nature. Essentially, these assumptions perpetuate a binary view where humans are conceived of as pre-existing and separate from nature. This perspective sustains the misconception that nature exists solely as a resource for human consumption. Furthermore, by the ontological separation of humans and nature, an inherent distance is naturalized, which ultimately reinforces common perceptions of climate issues as temporally and spatially

distant, hindering the sense of urgency concerning climate action. Thus, this article joins other research which seeks to highlight the need to reconsider the human/nature binary as part of the modernist episteme in the climate and energy literature (FAGAN 2017; PEREIRA 2017).

In order to face this conundrum and re-imagine how human beings can/should relate to extra-human nature, we turn to Mahāyāna Buddhist cosmology. Mahāyāna Buddhism is informed by the notion of *engi* (緣起), wherein a subject is seen as temporarily generated by a relationship with others mediated by an action. Since relationships are spontaneous and contingent, this means all things cannot but be impermanent. This relational ontology in turn assumes discontinuity in its temporality and focuses on the present. This is so to the extent that the past and future are considered to take the form of the 'past in the present' and the 'future in the present'; changes in the present thus appear directly as changes in the past and future. Moreover, *engi* relationality enables the monist idea of *eshō-funi* (依正不二), in which all beings are inseparable from and *intra*dependent with nature. Following the Mahāyāna Buddhist insights, we argue that Japanese and Taiwanese pro-nuclear energy narratives continue to subscribe to anthropocentric and modernist assumptions claiming that 'we' (humans) are capable of dealing with 'external' environmental issues and 'we' (the present generation) are the only stakeholders able to grapple with such issues by resorting to purportedly reliable technological solutions.

The remainder of this article begins by situating the topic in recent Western scholarly and public debates on climate concerns and energy security, which have led to the (renewed) popularity of nuclear energy as a one-stone-two-birds solution. The third section introduces Japan and Taiwan as examples of countries which have (re)embraced nuclear energy. The fourth section identifies some modernist beliefs informing the two countries' policies, explaining why these beliefs are problematic. The fifth section shows how Mahāyāna Buddhist insights enable different conceptions of relationality and temporality, challenging the assessment of nuclear energy as a climate-cum-security solution. The sixth and final section will consider the theoretical and policy implications of Mahāyāna Buddhist thought for re-imagining the climate crisis.

TWO BIRDS, ONE STONE: 'SOLVING' ENERGY SECURITY AND THE CLIMATE CRISIS

Current discourses on climate and energy, which on one hand emphasize the urgent need for decarbonization in energy production (MUNCK AF ROSENSCHÖLD ET AL. 2014: 639) and on the other hand struggle to fill the need for securing present and future energy supplies, fuel both scholarly and public debates on climate change in Western societies. This section will dig deeper into debates on energy security and climate change, and how they relate to one another.

While energy has always played a crucial role in society's life and development, it seems fair to say that energy dependence is currently greater than ever before. Energy shortages, it is said, threaten both individuals and society as a whole, which means that ensuring access to energy becomes an essential determinant for safety (STROJNY ET AL. 2023: 3). In other words, *"energy security in the traditional sense can be seen as a national or transnational security problem because securing steady supplies of fossil fuels, in particular, is crucial for the functioning of the economy and defense of the country or organization"* (IBID.: 11). This perspective on energy, and energy security in particular, is evident in the International Relations (IR) and Foreign Policy Analysis (FPA) literature, whose analyses tend to be informed by geopolitics. Goldthau (2011), for instance, identifies some debates that focus on a revival of energy mercantilism, which suggests that the world is ultimately engaged in struggles for resources (HERBERG – LIEBERTHAL 2006; TAYLOR 2006; ZWEIG – BI 2005); on energy as a foreign policy tool, which is an idea that assumes that energy is a means of state power projection exercises (ORBAN 2008; STULBERG 2007); or on potential future conflicts over energy reserves, where the analysis is anchored in classic realist assumptions (BORGERSON 2008). Essentially, the debates in this earlier literature tended to focus on access to energy supply with an additional focus on states as units of analysis.

A similar observation has been made by Kester (2022), who identifies four more recent strands of energy security research. In addition to realist and liberal policy reflections, the second strand of research attempts to describe, identify, categorize, and quantify a multitude of energy security threats (ANG ET AL. 2015; COX 2016; KISEL ET AL. 2016; KRUYT ET AL. 2009; SOVACOOL – MUKHERJEE 2011). This is followed by a strand of literature on how particular

perceived threats are securitized as an energy security concern (CHRISTOU – ADAMIDES 2013; NYMAN 2014; SZULECKI 2018). The final two types of energy security literature are small but deserve more attention as they are respectively concerned with trying to understand the underlying logics that structure how actors, policymakers, and scholars think, talk, and practice energy security (CIUTĂ 2010; CHERP – JEWELL 2011), and the performativity of energy security (KESTER 2017; NYMAN 2018). However, despite the rapid expansion of energy security definitions and metrics, and the literature's focus on the various problematizations and expressions of scarce energy supplies, little research has engaged with the underlying fear of scarcity itself or its implications (KESTER 2022: 32). Indeed, the fear that we are running out of (and thus competing for) scarce resources does not emerge out of a cosmological vacuum. It presupposes an environment external to humanity to control and dominate, as an entity out there to exploit for resources and commodities. Consequently, fertile ecologies are reduced to resources, and land to a commodity to be exploited/competed for for short-term commercial gain (DALBY 2022).

As illustrated, energy security is difficult to define, yet energy security, in terms of safe-guarding affordable future energy supplies, remains a central aspect of national security and energy policies. Moreover, as pointed out by Nyman (2018: 118), constructing energy security as a national security issue enables certain policy choices and often prioritizes these over other climate concerns. Meanwhile, the current debate on energy policy is becoming increasingly influenced by calls for decarbonization (STROJNY ET AL. 2023: 25), urging societies to explicitly acknowledge that any viable solution to climate change necessitates reconsidering *how* we use energy (NYMAN, 2018: 119). It is in this debate that a potential marriage between energy and climate discourse emerges. The current discourses are attentive to what individuals can do to reduce their own impact on climate change, specifically their carbon footprint. The United Nations' Sustainable Development Goals (SDGs), for instance, outline how individuals, as part of a collective effort to mitigate climate impacts, can change their behavior by considering their electricity use, travel habits, and consumption patterns (United Nations 2024). The United Nations Environment Programme (UNEP) also emphasizes the need for individuals to alter consumption habits and exert pressure on representatives, employers, and politicians to transition to a low-carbon world (UNEP 2021).

However, a 2019 Intergovernmental Panel on Climate Change (IPCC) special report also emphasizes that the capacity to engage in climate action is closely tied to an individual's sense of capability. When people feel empowered, they are more likely to adopt behaviors that support adaptation and mitigation. Motivation, often driven by values, ideology, and worldviews, plays a crucial role in climate action. Additionally, the report states that actions that offer personal benefits outweighing the costs tend to be favored, such as adopting energy-efficient appliances rather than reducing one's energy consumption in total (MASSON-DELMOTTE ET AL. 2019: 379). There are numerous hindrances to climate adaptation efforts, including limited resources, insufficient engagement from the private sector and citizens, and low climate literacy, in combination with a lack of political commitment (CALVIN ET AL. 2023: 9). Scholars have also identified various discourses of climate delay which pervade current debates on climate action. Climate delay discourses encompass various strategies that contribute to inaction, including individualism (MANIATES 2001), technological optimism (PEETERS ET AL. 2016), fossil fuel greenwashing (SHEEHAN 2018), and concerns over social justice and economic costs (BOHR 2016; JACQUES – KNOX 2016). Arndt's (2023) observation that energy security and climate change are often perceived as a question of trade-off is of particular importance as well. His study on perceptions about energy security and climate protection among Europeans shows that people more concerned with energy security tend to prefer coal, gas, and nuclear power over greener options, while people more concerned with climate change tend to prefer solar and wind energy. This is not a particularly surprising observation, but it does reveal the appeal of being able to successfully re-label nuclear power as a green.

In a nutshell, humans are central to these climate and energy narratives revolving around scarcity, geopolitics, the exploitation of nature, and individual responsibility, both as contributors to anthropogenic climate change and as agents of the social change that is necessary for an effective response (MASSON-DELMOTTE ET AL. 2019: 377). This does not have to be problematic in and of itself, but it implies an underlying logic assuming that humans and nature are separate entities, which presupposes the notion of an autonomous self 'right here' facing an external environment 'out there' (CHEN – KRICKEL-CHOI 2024: 15). This imagined separation is not new to the critical scholarship; what has been less noticed is the spatiotemporal distance between them, which in turn dampens the sense of urgency needed

for climate action. Being re-labeled as green, nuclear energy emerges as an apparently 'get-real' solution to both worries about a stable supply (energy security) and carbon reductions (climate change) here and now. In one fell swoop, it proposes to cut the proverbial Gordian knot and eliminate the need for a trade-off between energy security and climate change without having to challenge any of our preconceived notions about how we as humans interact with nature. The next section will turn to Japan and Taiwan as paradigmatic examples of states where nuclear power has been increasingly seen as the best available solution for the problems of both carbon emissions and a stable supply.

PROMOTING NUCLEAR ENERGY, ADDRESSING THE CLIMATE CRISIS

This section primarily examines how relevant actors in post-Fukushima Japan and Taiwan discursively present nuclear energy as a one-stone-two-birds solution. It does not seek to evaluate whether pro-nuclear energy narratives there carry more (or less) weight than their counter-narratives.

THE CASE OF JAPAN

Japan's traumatic experiences as the only country that experienced a direct attack of atomic bombs did not prevent its government from exploring the use of nuclear energy for non-military purposes as early as the 1950s. The Atomic Energy Basic Act (GOVERNMENT OF JAPAN 1955) already stipulated that its purpose is to *"secure energy resources in the future, achieve scientific and technological progress, and promote industry […] thereby contributing to the improvement of the welfare of human society and of the national living standard"* (Article 1).[3] Not unlike the aforementioned energy discussions in Europe, this law justifies the research, development, and utilization of nuclear energy by invoking the fear of scarcity. Although Article 2 indicates that nuclear energy in Japan is limited to "peaceful purposes" and its operation should be "democratic," "autonomous," and "open" (the so-called "three principles of atomic energy"), safety and accountability issues have periodically recurred in the country's history of nuclear energy. From the outset, the Japanese government constructed a linguistic dichotomy in its nuclear energy narratives: *"genshi"* (原子 atomic) refers to commercial applications and is peaceful; *"kaku"* (核 nuclear) refers to

the military ones, and is stigmatized. This helps us to understand why there has been no apparent contradiction between stigmatizing North Korea's nuclear and missile programs (MASON – MASLOW 2021) on the one hand and glorifying Japan's utilization of nuclear energy on the other. Indeed, securitizing the former's *"kaku,"* among other matters such as the abduction issue, has been central to the construction of North Korea as Japan's Other (HAGSTRÖM – HANSSEN 2015).

Several accidents and the long-serving, pro-nuclear energy Liberal Democratic Party's (LDP) loss of ruling power in 2009–12 notwithstanding, Japan's nuclear energy policy has arguably remained unchanged since its reactors started generating electricity in the 1960s (HASEGAWA 2021: 175). Notably, this policy derives from a hierarchical, one-party political system dominated by the LDP almost uninterruptedly since its founding in 1955 (VAN WOLFEREN 1990), which has been detrimental to the responsiveness and accountability enshrined in the "three principles of atomic energy" (HASEGAWA 2021: 176). Under the infamous 1955 system, in which the interests of the bureaucracy, politics, and the private sector became entangled and "harmonized" (COLIGNON – USUI 2001), utilities similarly maintained a long-term regional monopoly over the Japanese energy markets. Moreover, the policy builds on a perceived sense of vulnerability in the sense that Japan highly depends on overseas energy imports, which reinforces and is reinforced by the aforementioned scarcity mindset. This, in turn, is met with a strong modernist faith in technological solutions (HASEGAWA 2021: 176).

Although the Democratic Party of Japan (DPJ) presented itself as a viable alternative to the LDP and they appeared to differ over nuclear energy policy, DPJ politicians and allies did not speak in one voice regarding their purportedly anti-nuclear energy stance. A good example is Prime Minister Hatoyama Yukio's declaration of his commitment to the reduction of Japan's greenhouse gas emissions at the 2009 UN Climate Change Conference, which was based on the assumption that nuclear energy was conducive to the committed reduction while meeting Japan's electricity needs. The move to treat nuclear energy as green triggered an inter-ministerial strife within the cabinet (WALL STREET JOURNAL 2010).[4] The Federation of Electric Power Related Industry Workers' Unions of Japan (aka 電力総連 *"Denryoku-soren"*), a major DPJ supporter which nominated its members as DPJ Senators under the proportional representation system, was

openly hostile to the party manifesto's plan to phase out nuclear energy by 2030 (MAINICHI SHIMBUN 2013).

In the aftermath of the Fukushima Incident, a new regulatory agency (the Nuclear Regulation Authority, NRA) was established in 2012 to strengthen the safety requirements for nuclear power units and reactors. The majority of them either stopped operation permanently or took years to pass the NRA's review, which was a condition for their restart. In 2018, nuclear energy only accounted for 4.7% of Japan's electricity supply (compared to 31% in 2010), which was a figure lower than those for hydrogen and renewables (HASEGAWA 2021: N. 29). However, the second Abe administration's proclamation to gradually reduce Japan's dependency on nuclear energy should not be read as an end to the one-stone-two-birds narrative. The long processes of preparing for the restart of Japan's nuclear power units might have more to do with local governments' hesitation to approve their operation than with the NRA's regulatory hurdle being at *"the most stringent level in the world"* (MINISTRY OF ECONOMY, TRADE, AND INDUSTRY 2018: 23). Moreover, the LDP government's 2018 Strategic Energy Plan contained no roadmap to reduce Japan's nuclear power dependency, which was contingent on the state of energy saving and renewable energy availability (IBID.). Instead, the official narrative categorized (and sanitized) nuclear energy (alongside geothermal energy, hydropower, and coal) as the most stable and cost-effective *"base-load power source,"* and the government assigned itself the task of striking *"a proper balance"* between the available energy sources in Japan's *"multilayered and diversified flexible energy supply-demand structure [sic]"* (IBID.: 20). The 2021 Strategic Energy Plan reaffirmed the pledge to reduce dependency on nuclear energy, while pointing to Japan's decarbonization targets for 2030 and 2050 as well as its "global competitiveness" to justify its pursuit of energy and technological options such as small modular reactors (SMRs) and R & D in nuclear fusion (MINISTRY OF ECONOMY, TRADE, AND INDUSTRY 2021). Accordingly, the LDP government sought to achieve a power generation mix in which nuclear energy would bounce back to 20–22% in 2030 (IBID.).

In short, the recent pro-nuclear energy narratives in Japan have further tapped into the country's commitment to decarbonization (SASAKI 2020) and the call for an industrial-societal 'GX' (Green Transformation) in terms of 'S+3E' (safety, energy security, economic efficiency, and the

environment). Another move to securitize nuclear energy took place following the start of Russia's war in Ukraine. This can be seen in the recent call by some LDP Diet members, who formed a policy group to promote the replacement of existing nuclear reactors with the latest ones. The members invoked a sense of crisis in a techno-nationalistic tone: *"Nuclear energy's technology, human resources, and supply chains are in danger of decline. China and Russia are aggressively building nuclear power plants at home and abroad, and our country's relative advantage is diminishing by minutes"* (SANKEI SHIMBUN 2022). The Senior Network Section of the Atomic Energy Society of Japan similarly used "Energy Security Resilience is the Lifeline of Our Nation" as the theme of its 2023 symposium. The keynote speaker stressed the importance of energy self-sufficiency for Japan and considered renewable energy too pricy. Furthermore, because China holds a large portion of the markets in electric vehicles, offshore wind equipment, and solar panels, the argument goes, *"large-scale adoption of renewable energy will increase the risk of dependence on China"* (YAMAMOTO 2023).

THE CASE OF TAIWAN

Besides the fact that nuclear technology had been introduced to Taiwan for not-so-peaceful purposes (MENTON – REDDIE 2024) and the birth of anti-nuclear energy movements there intersected with the island republic's democratization in the 1980s (HADDAD 2023: 21), discussions about nuclear energy there have revolved around narratives similar to the Japanese ones, even if they are more partisan. On the surface, Taiwan's Atomic Energy Law (GOVERNMENT OF THE REPUBLIC OF CHINA 1968) was not driven by concerns over energy security. It was simply justified by a Kantian categorical imperative-like purpose: to *"promote the research and development of nuclear science and technology,"* along with the *"exploitation of nuclear resources, and the peaceful utilization of nuclear energy"* (Article 1). Ironically, Taiwan's nuclear policy under the authoritarian Kuomintang (KMT, the Chinese Nationalist Party) in the Cold War era was neither democratic nor open. Having lost the Chinese Civil War, the KMT remained determined to compete with its communist archenemy over who could represent China, and the former used its civilian programs to cover nuclear proliferation-sensitive activities following the latter's successful nuclear test in 1964 (MENTON – REDDIE 2024).[5] To sustain its ruling legitimacy when the Republic of China (ROC) in Taiwan was losing diplomatic ground to the People's Republic of China

(PRC) on the mainland, the KMT sought to boost the resource-lacking island's economic growth, among other measures (KRICKEL-CHOI – CHEN 2024). Nuclear power began to feature prominently in Taiwan's energy mix; at its peak in the mid-1980s, six units at three nuclear power plants accounted for 52.4% of all the electricity generated (GORSKA 2024). However, these power plants' site selection and construction processes failed to respect the respective local communities' will. In fact, the indigenous people living on Lanyu (Orchid Island), where a low-level radioactive waste storage facility is operated by the Taiwan Power Company, were not even informed about the purpose of the facility (OFFICE OF THE PRESIDENT 2017).

As the KMT's authoritarian rule was increasingly difficult to maintain amid calls for democratization in the 1980s, so was its pro-nuclear energy policy. The KMT government had to suspend its plan to construct the fourth nuclear power plant at Lungmen due to public opposition in 1985. The Democratic Progressive Party (DPP) was founded in 1986, which coincided with the occurrence of the Chernobyl accident. The newborn opposition party shared the anti-nuclear sentiment at home and abroad and embraced a policy stance critical toward nuclear energy. This stance was reinforced by the 2011 triple disaster in Japan and nationwide calls for "no more Fukushima," which was conducive to the DPP's subsequent (re)gaining of political power.[6] Led by Taiwan's first woman president Tsai Ying-wen (2016–2024), the DPP government promised to pursue a "nuclear-free homeland" by phasing out nuclear energy by July 2025, the license expiration date of the island's last operable reactor (WORLD NUCLEAR ASSOCIATION 2024). Critics of Tsai's phasing out policy argued that this decision had left Taiwan more dependent on imported (and dirty) fossil fuels since renewables (the 2023 share of renewables in the total power generation: 9.5%) were unlikely to be sufficient anytime soon (MINISTRY OF ECONOMIC AFFAIRS 2024).

That the politicization of nuclear energy in Taiwan was a "byproduct" of its democratization (MENTON – REDDIE 2024) should not obscure the fact that within the DPP there are emerging voices different from its traditional anti-nuclear line. Speaking at a National Climate Change Committee meeting, President Lai Ching-te stressed his government's commitment to a stable energy supply and the development of diverse sources conducive to net-zero emissions by 2050, including the latest nuclear technology, if social consensus can be reached on the issues of safety and nuclear waste.

Specifically, Lai referred to Japan's NRA to explain that decisions about whether to (re)operate nuclear power plants should be based on scientific safety regulations (LIBERTY TIMES 2024). After this introduction of the Japanese and Taiwanese pro-nuclear energy narratives and their shared logic, the next section will examine some metatheoretical assumptions underlying these narratives.

PROBLEMATIZING THE JAPANESE AND TAIWANESE PRO-NUCLEAR ENERGY NARRATIVES

Although the nuclear programs in Japan and Taiwan appear to have different initial orientations and nuclear energy has been a more partisan issue in the latter's democratization process, several similarities between the Japanese and Taiwanese pro-nuclear energy narratives can be recapped here. First, both refer to their respective government's commitment to the reduction of carbon emissions and the importance of achieving net-zero. The pursuit of carbon neutrality was unexpected when the nuclear energy law was promulgated in Japan and Taiwan, but it has been employed as a powerful discursive device for making nuclear power appear desirable and even necessary. As seen earlier, Japan's Energy Strategic Plan (MINISTRY OF ECONOMY, TRADE, AND INDUSTRY 2021) intends to reduce the country's dependency on nuclear energy *"as much as possible"* on the one hand and raise its percentage in the overall energy mix (from 6% in 2019 to 20–22% in 2030) on the other hand. This apparent contradiction can only be reconciled when one accepts that unabated carbon emissions amount to a "clear and present danger" whose mitigation cannot be left to non-nuclear energy sources alone. Challenging the DPP's "nuclear-free homeland" policy, the now oppositional KMT similarly invokes such terms as decarbonization and energy efficiency, and the pressing necessity of re-boosting nuclear energy in Taiwan is reinforced by its critique of non-nuclear energy sources, which argues that they either produce health hazards (coal-fired power generation) or might undermine environmental sustainability (e.g. solar PV power generation) (KUOMINTANG 2021).[7]

Second, while a stable power supply is considered essential for maintaining Japan and Taiwan's economic growth and people's well-being, pro-nuclear energy actors in Japan and Taiwan narrate its provision as being more stable and reliable than that of the existing green energy. It is

possible to narrate Russia's war in Ukraine as an "energy crisis" (YAMAMOTO 2023), for this narrative speaks to a modernist mindset that views (inter)dependence as something that causes vulnerability, and autonomy/self-sufficiency as desirable – in the Japanese context, the danger of dependence on imported energy before and during WWII was an example of this. As Japan faces this "existential threat," the securitization of Japan's energy enables the (re)use of nuclear power as an "extraordinary measure" (BUZAN ET AL. 1998) without which it would have been more difficult, if not impossible, to reverse the trend of reducing nuclear power in post-Fukushima Japan's energy mix. A corollary of this securitization is that Japan's nuclear energy technology must stay more advanced than that of its geopolitical rivals (recalling LDP Diet members' concerns over China and Russia), which in turn reproduces a competitive "culture of anarchy" in international politics (WENDT 1999). In the same vein, pro-nuclear energy actors have pointed to power shortages as a major issue for Taiwan's economy. Following a large-scale, five-hours-long blackout in August 2017, for instance, the National Association of Industry and Commerce called on the DPP government to reconsider its reliance on natural gas and *"entertain the possibility"* of completing the Lungmen nuclear power plant (WORLD NUCLEAR ASSOCIATION 2024). As Taiwan is the production base of the world's leading (and highly electricity-consuming) microchip makers such as the Taiwan Semiconductor Manufacturing Company (TSMC), the island's energy supply has been similarly securitized in the context of the US–PRC rivalry across various fields, from artificial intelligence development to military operations, which require the microchips (CHAUSOVSKY 2023). This need for a stable supply notwithstanding, Taiwan's energy supply chains are said to be vulnerable to a blockade by the Chinese navy partly due to the inadequate storage facilities for liquefied natural gas (RICE 2023).[8] Supply vulnerabilities, in turn, have been invoked by the Lai administration as an argument for considering the possibility of keeping nuclear reactors on standby in case of emergency (BLOOMBERG 2023).

Third, pro-nuclear energy actors in Japan and Taiwan share a modernist belief in nuclear technology as an effective solution for the problems of decarbonization and a stable supply. Despite the recognition of the 'myth of safety' that contributed to the disaster in Fukushima and beyond, the LDP government has been repeating the mantra that the NRA has the scientific authority to judge/approve matters such as the

discharge of the ALPS-treated water into the sea or the (re)operation of nuclear power plants (MINISTRY OF ECONOMY, TRADE, AND INDUSTRY 2021).[9] In other words, Japan's energy supply has been securitized through an apparently apolitical, technical justification of the extraordinary measure for the fulfillment of 'GX' and 'S+3E.' Likewise, on an island with low levels of energy self-sufficiency (3.8% in 2023) (MINISTRY OF ECONOMIC AFFAIRS 2024), Taiwanese pro-nuclear energy actors maintain that this and carbon emission issues are challenges that are manageable with advanced technology. A 2018 national referendum topic was based on the assumption that nuclear energy and renewable energy are complementary, and promoting the former helps to buy time for developing the latter (以核養綠 *yǐ hé yǎng lǜ*). Tung Tzu-hsien, the vice convenor of the National Climate Change Committee and the CEO of an electronics manufacturing company, went further to assert that nuclear energy not only helps to contain rises in electricity bills (and thus mitigate inflation), but it is also not carbon-emitting and could lower the likely carbon taxes levied on Taiwanese exports by the EU or other developed countries (CENTRAL NEWS AGENCY 2024).[10] Acknowledging that nuclear energy is no silver bullet, some policy analysts concluded that despite their higher cost per unit or high initial costs, adopting the latest technology for operating SMRs and molten salt reactors (MSRs, which convert thorium to U-233 to produce nuclear power and are cooled down by liquid salt or carbon dioxide instead of water) could enhance Taiwan's nuclear safety and energy security (GORSKA 2024). A failure to retain the nuclear option now would only make it more difficult to revive nuclear power programs, as *"inherently technical endeavors,"* if the government allows *"experience, expertise, and infrastructure to atrophy"* (MENTON – REDDIE 2024).

The similarities between the Japanese and Taiwanese pro-nuclear energy narratives are perhaps unsurprising as they can also be seen in the recent European debates discussed earlier. Notably, they point to three inter-related metatheoretical assumptions: (1) the human/nature divide; (2) veneration of autonomous individuals; and (3) linear progression of time. To be sure, this observation is not entirely novel. The relevant literature has recognized that the climate crisis is fueled by expanding human desires (Yamamoto 2006: 149). Against anthropocentrism, for instance, research in environmental ethics alerts us that nature has been used and commodified as an 'external resource' to realize human desires for prosperity. The object of desire also includes human beings, who are positioned

as 'external Others' to the subject. The exploited human being can be understood as parallel to the exploited nature in that: he or she is external to the exploiter's market; an element essential for the economy to work; and the object of desire. Through this process of 'modernization,' people (are supposed to) become autonomous individuals pursuing their own self-interests as subjects of desire in the industrial society. What underlies human desire is an anthropocentric structure in which the exclusive domination by humans as subjects over nature as a set of objects, and humans' domination over other humans overlap and reinforce each other (KIOKA 2014: 81). The "subject of desire" model and its assumption of a modern self have long been part of IR's metatheoretical foundations.

Logos-dualism, recalling Descartes's division of human existence into 'spirit' and 'object,' is central to the ontological assumptions of the aforementioned anthropocentric model; the process of industrial development separated humans from nature, positioning the latter as a mere 'external resource' for the former (KIOKA 2014: 65–67; LATOUR 2017). This self-centered dualistic ontology is discernible in not only the Japanese and Taiwanese cases but also various SDG projects. This is because these projects seek to cope with such crises as climate change and environmental degradation while preserving the capitalist system, which has arguably contributed to the very crises they attempt to tackle. To put it differently, the SDGs are at best a project for the survival of a sustainable society in an anthropocentric sense (SAITO 2020). On the other hand, research in environmental ethics has not resolved the subject–object separation between humans and nature (KIOKA 2014: 83–85), while taking a prevailing conception of time (in which the autonomous individual's existence stays constant as the linear time progresses) for granted. Unless we consider a non-logos-dualistic, temporality-sensitive approach, the climate crisis cannot be reimagined outside of the anthropocentric framework, and nature will continue to be a separate object for human beings. In other words, without the perspective that humanity *becomes* human by living with and through various human and non-human others, nature will remain a means to fulfill human desires (MAEDA 2023: 250). The next section will turn to Mahāyāna Buddhist thought to rethink the examined metatheoretical assumptions that make both the climate crisis and the nuclear energy solution possible.

MAHĀYĀNA BUDDHISM AS A COSMO-ECOLOGICAL APPROACH

The term Mahāyāna Buddhism, literally meaning "great vehicle," refers to a group of diverse Buddhist philosophies and practices in which a person seeks to become an awakened Buddha for the benefit of all sentient beings through the path of the bodhisattva. From a Mahāyāna Buddhist perspective, phenomena arise through *engi*: in contrast to the modern, logos-dualistic conception of the self as autonomous, self-interested, and stable, in this view, no being exists independently but each being is generated by constantly changing conditions and relationships. Accordingly, human suffering arises from the illusion of permanence, and pursuing health, wealth, or status in an ever-changing stream (YAMAMOTO 2006: 149–150).

Engi relationality includes spatial and temporal aspects, and the two are closely connected. In the spatial aspect, subjects are temporally generated by relationships with others mediated by an action. In logos-dualism, for instance, 'I swim in the ocean' assumes that 'I' and the 'ocean' pre-exist before the encounter. *Engi* relationality views 'I' and the 'ocean' as *becoming* I (the swimmer) and the ocean, respectively, through the action of swimming. Without swimming, neither would exist. When the action of using ocean water to generate electricity occurs, it no longer *becomes* the 'ocean' but an external resource, and simultaneously, the 'I' *becomes* I (the worker). Thus, relationships generate subjects, not the other way around.

Mahāyāna Buddhism rejects any pre-existing or fixed relational structures, for *engi* relationality is grounded in *ku* (空 emptiness), a concept that unravels the ever-changing nature of all phenomena. Unlike linear temporality, which assumes a continuity based on a notion of fixed subjectivity, the *ku*-informed temporality assumes discontinuity. If relationality and the subjects generated by it are impermanent, then neither the past nor the future, which these impermanent subjects are supposed to perceive, can exist. Just like a flower that blooms and decays through *engi* (relationships) with the earth, water, and sunlight, the subject cannot exist permanently and universally. Temporality in Mahāyāna Buddhism focuses on *nikon* (而今 the present), where relationships arise. Seen from *nikon*, the past and future take the form of the 'past in the present' and the 'future in the present,' which means that changes in the present simultaneously manifest themselves as changes in the past and future (SHIMIZU – NORO

2023, 2024: 1039). Accordingly, *nikon* is open to unpredictability, as it is not bound by a fixed historical past or predetermined future. Herein lies the spatial aspect of *engi*, which recognizes the emergence of spontaneous and contingent relationships (SHIMIZU 2020: 105–106); space (here) and time (now) are closely connected and inseparable in engi relationality (SHIMIZU – NORO 2023: 383).

For Mahāyāna Buddhism, subjectivity is constituted through language, which simultaneously defines and differentiates the self from the other by establishing clear boundaries. As Shimizu notes, the word 'I' defines 'I' as distinct from 'you,' while under 'we,' both are grouped together but distinguished from 'them': *"So long as one retains a particular word to refer to the self, subjectivity would become relatively stable. This stabilised subjectivity is a prerequisite for the contemplation of the past and future"* (SHIMIZU 2022: 145). Moreover, the process of stabilization through language is not limited to subjectivity but extends to the categorization of the 'external' world. Just as language fixes and differentiates fluid subjects, it also imposes conceptual boundaries on natural phenomena. For instance, while nature itself is in constant flux, the act of naming and categorizing it under the term 'nature' leads to a perception of it as a stable entity. Such categorization helps simplify and stabilize the fluctuating reality of nature (MAEDA 2023: 259).

Although linguistic intervention creates the cognitive illusion of an independent self, Mahāyāna Buddhism maintains that the self and the other are spatially and temporally inseparable because they are generated by *engi*. On this basis, everything can be understood as *fuitsufui* (不一不異 neither unity nor diversity): the self and the other are both identical and different by being neither identical nor different (KIOKA 2017: 257). When applied to the environmental context, a conceptual corollary of *fuitsufui* is *eshō-funi* (oneness of life and its environment): life and its environment are inseparably interconnected, with neither being separate from or identical with the other, but both existing in a dynamic relational whole. *Eshō-funi* resonates with the life theory developed by the biologist Fukuoka Shinichi (2018). According to Fukuoka, life is a relational flow that barely balances itself through the complementary process of generation in a spatial sense and disappearance in a temporal sense; it never stays in the same state for a moment. For example, the metabolism of animals achieves a dynamic equilibrium by obtaining energy from external resources such

as food, water, and oxygen, while expelling 'old' cells and waste products. This flow, or life, is only possible through *engi* relationships with its environment. The function of language gives us the illusion of a fixed and autonomous self by concealing the dynamic nature of life and its inseparability from others.

Furthermore, Fukuoka suggests, the complementary process of generation and disappearance means the creation of time. For instance, we can understand environmental transitions by observing the annual rings of trees; this implies that the annual rings generate time (i.e. the flux of nature). Even at this very moment when the authors are writing this article, the annual ring is constantly weaving through time; it is being generated by the environment while simultaneously generating the environment (IBID.). Thus, time in the notion of *eshō-funi*, is not spatialized linear time in logos-dualism, which is geometrically represented as a point,[11] but the *flow* of life itself. Crucially, each moment (*nikon*) of that flow contains what can be called eternity. As with the case of the annual ring, each moment contains the *transition* of the environment, namely, the past and the future. This insight suggests that the 'past in the present' is not merely an accumulation of events but is constituted through the process of meaning-making in the present. Likewise, the 'future in the present' is not fixed but rather an open possibility shaped by our present actions and perceptions. In short, *nikon*, in which we live, struggle, and make choices, is a 'lived' time interwoven through countless *engi* relationships. By acknowledging and respecting this 'lived' present, we do not merely experience time as a mechanical progression; rather, we cultivate ethical responsiveness to both the past and the future within the web of our relationships with others.

What does it mean, then, to consider climate and energy issues 'here and now' in a Mahāyāna Buddhist sense? The 'here and now' assumption in the aforementioned pro-nuclear energy narratives, namely that there is a 'Japan' or 'Taiwan' right here with a pressing carbon neutrality commitment and an energy security need, is fundamentally different from that of Mahāyāna Buddhism, as the former presupposes the existence of an already formed, autonomous, and stable state self which knows what 'it' needs. The ontological existence of such a pre-social 'Japan/Taiwan,' in turn, is made possible by a linear, continuous temporality underlying a coherent 'Japan/Taiwan' in the past, present, and future.

The notions of *engi* and *nikon* deconstruct these ontological and temporal foundations of the climate-cum-energy crisis, since 'Japan/Taiwan' only *becomes* a civil nuclear power state through ever-changing relations with others (humans and extra-human nature, which are co-produced by their relations with 'Japan/Taiwan') in each *nikon*. *Engi's* relational ontology does not imply that all such *intra*actions are equally desirable. Rather, it points to the need to cultivate our ability to reflect on whether certain intraactions are more violent than others (e.g. locating nuclear power plants or radioactive waste storage facilities in less populated areas such as Fukushima or Lanyu in exchange for a 'subsidy') and how such violence could occur.[12] Taking discontinuity in its temporality seriously, the *engi* notion shows that nuclear waste storage is not a one-time, 'long-term' issue that belongs to our indefinitely distant future. When recognizing 'the future in the present,' it becomes clear that storing or disposing of nuclear waste involves constant negotiations with future stakeholders in each *nikon*, since decisions in the present appear directly as changes in the future.

The failure to imagine the climate crisis beyond modernity is endemic to pro-nuclear energy narratives in not only Japan and Taiwan but also Europe. From a *nikon* perspective, it is helpful to reflect on a period of profound change in (Western) Europe that was similarly categorized by contemporaries as a time of enduring crisis – the 1970s – in light of the 'past in the present.' European nuclear power proponents then also presented it as a *"technological solution for economic ills, capable of providing the knowledge-based economy with fuel and jobs for decades to come; it was [...] the pinnacle of high modern aspirations towards 'progress', with even its more problematic aspects to be kept in check by rational, scientific and technological management"* (Tompkins 2021: 508). The pro-nuclear energy narratives in contemporary Japan and Taiwan can thus be made sense of as a past in the present, as if it was their 1970s European counterparts' failure of imagination repeated in the 2020s. Both allowed premature or even risky technology (used for MSRs or nuclear fusion in today's case) to be rushed to commercial use for reasons of national competitiveness and economic profit.

This leads to our final point. If time can be understood as the flow of life, as the idea of *eshō-funi* suggested, the modernist conception of time is inherently violent. By fixing time as a point in a given place (e.g. 2030

as the target year to make Japan a country with 20–22% of its electricity generated by nuclear power), it does not allow for the transformation of subjects or formation of open-ended relationships. It also reproduces the persistent logos-dualism of humanity/nature: humanity makes a harmful footprint on the earth (i.e. carbon emissions), and proponents of nuclear energy maintain that it can significantly reduce this footprint. While the critical scholarship has recognized humanity-in-nature and called for re-orienting our security referents to ecosystems when thinking about the climate crisis (MCDONALD 2021; DALBY 2022), this laudable move is potentially totalizing as humans and human organizations can be subsumed under nature. The idea of *fuitsufui* provides an alternative way to think about how humans relate to themselves and to extra-human nature by going beyond the other logos-dualism of substances/relations. Japan/Taiwan and nature are not two discrete, interacting substances. Rather, 'they' are neither identical nor different, as they are co-produced by a complex web of relationships that brings about historical change (climate change in this case). As Moore (2015: 7) put it, *"the species-specificity of humans is already co-produced within the web of life. Everything that humans do is a flow of flows, in which the rest of nature is always moving through us."* From a Mahāyāna Buddhist perspective, this research has analyzed how the generation of nuclear power in Japan and Taiwan can be understood as a case of car-boniferous capitalism's historical geographies premised on specific con-figurations of humanity-in-nature.

CONCLUSION

In contemporary Japanese and Taiwanese pro-nuclear energy nar-ratives, the advocates emphasize the necessity of solving carbon emis-sions and energy security issues (here) and the urgency to retain and/or modernize nuclear power generation capabilities (now). This article has shown that nuclear energy does not offer a 'deep' solution to climate and energy crises here and now. This is in part because the geometrically linear conception of time which underpins the aforementioned narratives, sets the future as a pre-fixed goal, foreclosing the room for a flexible reconsid-eration of the lessons of the past and our responsibility to future gener-ations. Furthermore, it is useful to recall that measures premised on the modern belief that nature is an external resource for the pursuit of human interests, may instead accelerate climate change in the future (SUZUKI 2020).

Possible victims of that belief include not only plants and animals but also human beings, who are posited as the modern subjects. As revealed, the one-stone-two-birds solution proposed by Japanese and Taiwanese pro-nuclear energy narratives relies on an anthropocentrism that simultaneously downplays our responsibility for future generations and regards nature as a means to human ends. A fundamental reconsideration of such a perspective is essential in combating climate change. To this end, it is all the more important to reexamine the modernist framework itself and develop a more equitable, less violent, and non-dichotomous perspective on the human/nature relationship.

We have drawn on Mahāyāna Buddhist thought to reinterpret the present (*nikon*, now) as a moment in which the subject is temporarily generated through its relations with others (*engi*, here), understanding it as a dynamic process where the 'past' and 'future' intersect. Things are not long-lasting but merely temporary phenomena generated by relationships with others and given a name by language (NAKAZAWA 2019: 46). In this sense, 'nature' is a verbal expression of the way 'we' relate to 'them,' and there is no pre-existing 'nature' outside of 'us'. Nature does not exist as a resource outside of humans, but is constructed and understood as such because we narrate and relate to it as if it did. From this insight, the first question we should rethink in response to climate change is how to relate to 'nature'. After all, how we face 'nature' will determine whether it is simply an external resource to be used (a means) or an interlocutor (an end) with which we work to address climate change. The web of *engi* suggests that no beings exist independently but all are relationally generated as a dynamic whole (*eshō-funi*); the *engi* way of relating-becoming indicates that 'we' bear the ultimate responsibility to others, including future generations. In addressing climate change, then, the issue is not merely about technical solutions, but about how 'we' weave our web-relationship as nature.

Finally, we recognize that further research is needed to re-imagine climate change practices in light of Mahāyāna Buddhist thought. As noted, Mahāyāna Buddhism does not (pre-)determine what action would be 'good' for climate change mitigation because of its assumptions of emptiness and discontinuity. What is 'good' for the global ecology must be considered in each concrete context and in relation to 'nature'. In this regard, the case of Bhutan is worthy of study because its government applies Mahāyāna

Buddhist values to environmental policy and defines the country's relationship with 'nature' as coexistence rather than exploitation of resources (JEFFREE 2013). In fact, Bhutan has already achieved carbon negative status without resorting to nuclear power. Although its geographical feature of forests, a natural sink for carbon dioxide, covering 70% of the country, should be taken into account, it would be helpful to learn how Mahāyāna Buddhist thought has been digested and practiced in the environmental efforts of relevant actors in Bhutan in order to reconsider how 'we' might relate to 'nature'. Meanwhile, the fact that Bhutan's hydroelectric power plants, its key source of electricity production, could be severely damaged by the melting of glaciers in the age of global warming (TUTTON – SCOTT 2018) serves as a constant reminder that the *engi* relationships might unfold adversely. But if this is the case, even more so, it is all the more urgent to study and foster climate change measures informed by an *eshō-funi* worldview.

ENDNOTES

1   For instance, the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology countered that nuclear power cannot be considered a *"sustainable activity within the meaning of the TR [EU Taxonomy Regulations]"* (Lünenbürger et al. 2020: 60).

2   The surname precedes the given name in the names of all East Asian individuals in this article, except in cases where they are listed as the authors of published works in English. The transliteration of Chinese terms follows the Pinyin system; that of Japanese terms, the modified Hepburn system. Wades-Giles transliteration is used for the names of individuals and places in Taiwan.

3   The English translation is from <https://www.japaneselawtranslation.go.jp/en/laws/view/3759>.

4   This article is not concerned with whether and how far non-carbon-emitting nuclear energy is green. To the extent that the pro-nuclear energy narratives in question are grounded on narrow, modernist assumptions of relationality and temporality, the present authors are normatively motivated by an anti-nuclear stance.

5   The KMT government's covert program only came to an end in the late 1980s after the US twice intervened in it (Albright – Gay 1998).

6   This solidarity reinforced existing anti-nuclear sentiments, pushing the KMT government to halt the construction of the nuclear power plant at Lungmen in 2014. While the results of a 2018 national referendum were in favor of maintaining Taiwan's nuclear power sector beyond 2025, a 2021 referendum rejected the possibility of resuming the Lungmen plan (World Nuclear Association 2024).

7   By questioning the environmental impacts of both fossil fuels and renewables, the KMT implies that there is no alternative to nuclear power without mentioning the term nuclear in its manifesto (Kuomintang 2021).

8   To be sure, nuclear energy is not immune to the impact of blockades because Taiwan's reactor fuel, too, is imported. The example of the Zaporizhzhia power plant after Russia's invasion of Ukraine suggests that nuclear plants can also be made the objects of attacks (Rossi 2023).

9   The term ALPS (Advanced Liquid Processing System) refers to the system used to purify water from the Fukushima Daiichi Nuclear Power Station, which contains radioactive substances (Ministry of Foreign Affairs n.d.).

10   Nuclear energy cannot be green in the EU taxonomy if the storage of highly radioactive waste material is not operational by 2050, among other conditions. Although nuclear power may be a non-carbon-emitting "clean energy" (Citizen of the Earth, Taiwan 2024), many of the Taiwanese benchmark companies pledged to start utilizing renewable energy only by 2040 (Climate Group n.d.).

11   In logos-dualistic modern science, the researcher freezes time as a point, e.g. t=0, t=1, etc. By 'pausing' the world, they observe and understand the world as if it were animated by connecting a series of snapshots. From the perspective of *eshō-funi*, modern subjects stop the dynamics of life at their convenience, "killing life," and observing it (Fukuoka 2018: 269–270).

12   Some might think nuclear energy's key problem is that it naturalizes more energy production for national security and capitalism, as opposed to lower energy consumption. While radioactive waste storage is not necessarily the biggest downside of nuclear energy, our point here is to illustrate the prevailing pro-nuclear energy narratives' failure to take the present seriously in light of *nikon*.

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