

Toward a Sustainable Taiko Career

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About a decade into my career, I face a difficult reality. As a touring musician, my work is in conflict with environmental sustainability. My touring produces far more than my fair share of greenhouse gases. Fixing the problem will require the prioritization and elimination of much of my travel, and threatens my access to artistic outlets I currently hold dear. However, the climate science is clear. Something needs to change quickly.

I am therefore implementing personal limits to my CO₂ production, with the goal of reaching sustainability in 10 years. I will track the CO₂ produced by my flying and long-distance driving and stick to increasingly-strict annual limits.

The 10-year plan provides a transition period for me (and my family and colleagues) to gracefully replace the current dependence on frequent air travel with sustainable alternatives, including the ambitious project of touring by bike. Although change will be difficult, in this plan I see an opportunity to deepen my art with greater meaning and purpose. Even more profoundly, I see an opportunity to reshape problematic aspects of my identity.

Terrifying New Math

Bill McKibben's 2012 Rolling Stone article, *Global Warming's Terrifying New Math*, lays out the daunting problem of curbing global CO₂ production.¹ A summary of the article:

- 2° global warming = 565 gigatons CO₂ budget
- Big Energy holds 2795 gigatons
- Government won't save us

Climate scientists around the world have settled on a maximum allowable increase in global average temperature of 2 degrees Celsius. Below 2 degrees Celsius, the earth's climate has a chance of remaining stable. Above 2 degrees, however, we face extreme weather, desertification, ocean acidification, mass extinction, and the loss of coastal cities. The most vulnerable populations — the poor in the developing world — would bear the brunt of the centuries-long disaster. Many scientists think the maximum allowable increase should be well below 2 degrees, but no one thinks it should be higher. It is the one thing in climate change about which everyone agrees.² We must limit global average temperature increase to 2 degrees or less.

Climate scientists have estimated how much CO₂ we can release into the atmosphere before we lock in the eventual rise to 2 degrees: 565 gigatons between now and 2050. Humanity has a budget of 565 gigatons of carbon to release before we've likely doomed our planet to dramatic climate change.

McKibben goes on to explain that energy companies (big oil corporations, coal companies, etc) currently have 2795 gigatons of CO₂ in their projected holdings. These corporations plan to develop and sell more than five times our total CO₂ budget. It is hard to imagine how corporations and the market might save us.

The US government is unlikely to effectively intervene. Even prior to President Obama's embrace of expanded fossil-fuel production and the quagmire of the current Congress, the government has repeatedly failed to enact substantive legislation curbing emissions. US scientists have been sounding the alarm regarding human-induced climate change since the

1970's, but our government has been unable to mandate significant change, domestically or abroad. In fact, the United States is widely considered an impediment to international cooperation on legally-binding climate agreements.

Time to act is running out. At our current trajectory, the Australian Climate Commission estimates we will consume our total CO₂ budget by 2028.³ In the coming fourteen years, we will have largely determined the future of the planet.

The Trump Card

Although McKibben's article calls the math "terrifying", my reaction was different. I was deeply inspired. The urgency of the problem and the implausibility of corporate or governmental action makes personal action critical. I hold the trump card. I can stop buying gasoline, and no energy company is powerful enough to make me purchase it. I can reduce my air travel now. I don't need to wait for government to wrangle legislation through the deadlocked system. I can implement the rules I wish were law, today. My sphere of influence might be small, but I have total, unequivocal control over it. I alone can stand up to climate change.

To calculate a personal CO₂ budget, I divide the 565-gigaton total budget by the earth's population (approximately 8 billion), and divide that number by the remaining 36 years between now and 2050. It works out to about 2 tons. This means each of us gets 2 tons of CO₂ per year, before we have committed the planet to greater than 2 degree warming.

The Enticement

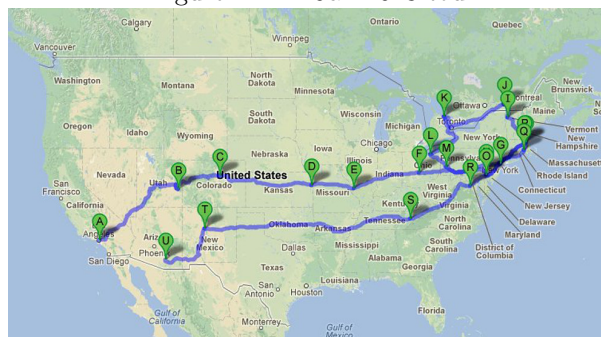
"2 tons." I was surprised how firmly I latched onto this number when I read it. For the first time I had an objective measure of my sustainability. The climate doesn't care how I use my 2-ton budget; whether I drive a few miles in a Hummer or a few more miles in a Prius.⁴ Only the total amount matters, and the number applies to everyone equally. If I can get my CO₂ production down to 2 tons per year, I'd

know reasonably well my lifestyle isn't killing coral and drowning the Maldives. I'd know my art isn't being created at the expense of the world's poor.

The Catch

A round-trip flight to Japan is 2.92 tons.

Figure 1: KB Jan 2013 tour



I flew on five trips in 2013, for vacation, family, and work, producing almost 14 tons of carbon dioxide. I also participated in four *Ōn Ensemble* driving tours, producing an additional 3 tons. These 17 tons from travel dramatically outweigh everything else I do. My efforts to reduce trash by shopping at the farmers' market and buying in bulk (-.01 tons), my vegan diet (-2 tons), and my recently car-free lifestyle (-4.2 tons) are completely overshadowed by my travel choices. In fact, for all my concern over the environment, I'm on par with the average American in CO₂ production, and worse than 94% of all other countries' citizens.⁵

I am the problem.

Clearly I need to stop flying. But with family living abroad, friends and teachers in Japan, and my artistic dependence on touring, a sudden stop to air travel would be painful for me and the people I most value. To commit to change and simultaneously ease the transition, I am implementing the following plan.

The Plan

I will immediately cut my CO₂ from air travel and driving by 40%, to a maximum 10.5 tons in 2014. Al-

Table 1: KB 2013 CO₂ from travel

Purpose of travel	Notes	KB CO ₂ in tons
Jan cross-country tour	8395mi / 4ppl ⁶	1.29
Feb Japan trip	LAX↔NRT ⁷	2.92
	HND↔HKD	0.26
Mar ID/MO tour	3339mi / 4ppl	0.51
Apr Hawaii teaching	LAX↔OGG	1.32
Jun Hawaii teaching	LAX↔OGG	1.32
Jun Japan trip	(same as Feb)	2.92
Aug Sacramento teaching	LAX→SMF	0.11
	SMF→SFO	0.03
	SFO→LAX	0.10
Sep Japan tour	(same as Feb)	2.92
Oct WA tour	2765mi / 4ppl	0.42
Oct OR tour	603mi / 2ppl	0.18
	330mi / 3ppl	0.07
	330mi / 2ppl	0.10
	603mi	0.37
Dec St Kitts trip	LAX↔MIO↔SKB	2.06
		Total — 16.9
		Personal travel — 8.16
		Work travel — 8.74
		Travel by air — 13.96
		Travel by car — 2.94

though far from sustainable, it is an immediate and significant reduction. From this manageable beginning I will reduce my budget by one ton per year until I reach 1.5 tons in 2023, offsetting my CO₂ along the way.

The CO₂ budget will force me to consider my travel carefully and weigh my priorities. As I write this in April 2014, I have already scheduled the use of more than half my entire budget for the year (for a pre-arranged study trip to Japan – 1.46 tons – an invitation from there to England to teach and perform – 3.03 tons – and a possible family trip to the east-coast – 1.4 tons). Clearly, the constraints of the

budget will be felt quickly and I will likely have to forego opportunities that arise this year.

These impending constraints bring a certain amount of anxiety. Will I fade from significance in the taiko world? How will I continue my study of shamisen? Will I be able to see my nieces' graduations?

The more I've thought about the plan, however, the more I believe these fears are wrongly pessimistic. If my experiences with veganism and car-free living are any indication, living closer to my ideals will feel more like success than sacrifice.

Table 2: Annual CO₂ budgets

Year	CO ₂
2013	16.9
2014	10.5
2015	9.5
2016	8.5
	⋮
2022	2.5
2023	1.5

The Harmony of Values

For a month back in 1995, I missed the taste of chicken fingers. The switch to a vegan diet began with a promise to myself, a commitment to animals, and no small number of self-control tricks to resist temptation. Not long after going vegan, however, the cravings abated as I came to enjoy the health, environmental, and ethical benefits of the new foods I was choosing. Food became more than flavor.

Thanks to the switch, I’ve achieved a sort of food nirvana. I now eat delicious, nourishing, fresh foods, purchased from people I know and like. I buy the very best ingredients without concern for cost. My body is at its ideal weight and I have zero bad cholesterol. The sacrifice of going vegan morphed into an indulgence. Chicken fingers pale in comparison.

The transition to bicycle commuting has been similar. I used to think, “I can’t afford the time to ride my bike.” But giving up the car forced adaptation. Now I have a “bus work” category in my to-do list for things I can do while in transit, like planning classes, memorizing music, and reading. Now the calculation goes, “If I were to drive, I would be doing nothing for 45 minutes. If I ride my bike, I get 30 minutes of exercise, do 60 minutes of work, and I arrive feeling good about myself.” Travel nirvana.

I am hopeful that my CO₂ reduction plan will follow a similar arc; that the improved alignment of my lifestyle and my values will result in an easy harmony. When travel becomes a limited commodity, it also becomes more special. When I *do* go to Japan,

I’ll likely go for a month instead of a week. Tours by bike might be slower paced, but they’ll be filled with exercise, friends, and back-road views. From this perspective, it seems all-but-inevitable that living by my ideals would result in my spending more time doing what I value.

Impact on $\bar{\text{O}}\text{n Ensemble}$

Masato Baba, Shoji Kameda, and I founded the contemporary taiko group, $\bar{\text{O}}\text{n Ensemble}$, in 2001. As the least-experienced player of the group, I put $\bar{\text{O}}\text{n Ensemble}$ first in everything I did. The group has been the bulk of my work and responsible for the majority of my growth as an artist. Thus when considering this CO₂ reduction plan, my first concern was my involvement with $\bar{\text{O}}\text{n Ensemble}$.

Thankfully, on a logistical level, $\bar{\text{O}}\text{n Ensemble}$ is well positioned to handle my increased absence. The group has transitioned to more flexible membership, with reliable, creative collaborators ready to fill in when necessary, and the group has benefitted artistically from this access to wider musical input. At a minimum, I can take advantage of local opportunities. Approximately half of the group’s work is currently on the west coast, and this should remain accessible to me for the foreseeable future. Some of $\bar{\text{O}}\text{n Ensemble}$ ’s most artistically productive concerts are self-produced here in Los Angeles. If nothing else, I can be the home-base $\bar{\text{O}}\text{n Ensemble}$ member.

Here again, however, lurks a quiet pessimism, and an undue focus on sacrifice. $\bar{\text{O}}\text{n Ensemble}$ ’s agent, Rachel Cohen, immediately saw opportunities. “Change your bio to represent your beliefs, and offer a lecture/discussion on the dilemma you and other artists face. We’ll likely find ways that these values can open doors for you.”

Thinking this way, I realize that what I am doing might well be valuable for $\bar{\text{O}}\text{n Ensemble}$. Climate change is not going away, and dealing with its consequences won’t get easier. My work might help prepare the group for a future in which carbon has a price and touring is more difficult. Within the framework of the plan, I’ll work to maximize the positives (continued collaboration and musical development)

and minimize the negatives (scheduling challenges and missed performance opportunities).

Impact on Family, Friends Abroad

With relatives on the east coast and friends and teachers in Japan, my travel limitations will complicate to the challenge of making time together. I currently wish I could see these people *more*, not less.

This issue will likely be the biggest challenge of this plan. Thankfully, my family and friends are extremely supportive, offering to do whatever they can to help me succeed. We'll take better advantage of chance opportunities to get together. I'll finally get my webcam working. More fundamentally, I will prioritize these relationships in my annual planning, budgeting my CO₂ carefully to maintain get-togethers as frequently as possible. The poignancy of this challenge derives from my deep love for these people. I hope it is this love that will allow me to find chances to be with them.

Bike Touring

The next 10 years provide a period for me to experiment with tour cycling, with the goal of a fully sustainable touring option for my music. How could I get to venues by bike, and how far can these venues be from Los Angeles? I will need to design, construct, and refine bike trailer designs to cart equipment, develop amenable venues and tour routes, and rope-in similarly crazy collaborators to join me.

Granted, there are few instruments more poorly suited to bicycle touring than taiko. If only I were a singer! A flutist! Taiko are some of the largest and heaviest musical instruments (aside from the piano and organ which are generally provided by the venue), and each player usually plays multiple drums.

However, the implausibility of self-powered taiko touring is its greatest asset. It would be a first in our art-form. Carting taiko by bike should make us *more* unique to presenters and fliers advertising our performances become *more* compelling "Taiko is coming... by bike!" In 1990, the seminal group, Ondekoza, spread taiko across the United States with an incredible 14,910-kilometer "US Marathon Tour".⁸

The running was a critical part of what made the tour historic and Ondekoza special.

Figure 2: Taiko at CicLAvia 2012



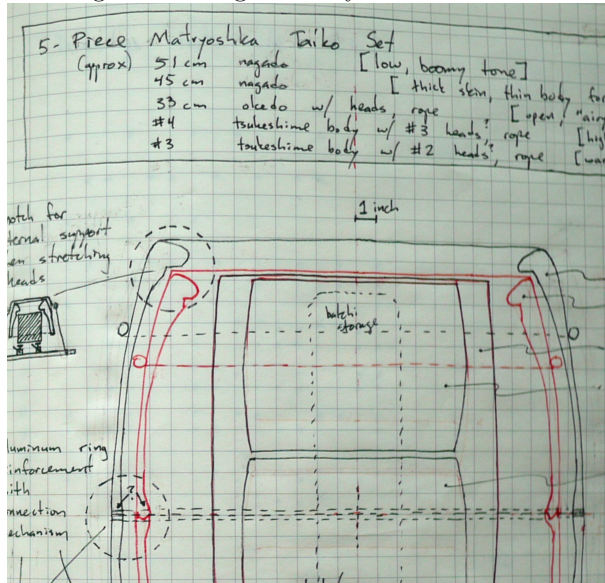
Impact on My Art

Even with the best trailer designs, however, bike touring will necessarily impose limitations, possibly requiring changes to my music. I should seize these changes as opportunities to grow as an artist and to imbue my work with added meaning. Limited instrumentation, for example, might pressure me to extract greater range from fewer instruments and become a more versatile performer. I'll likely utilize pieces like the technical *Watashi Watashitachi* and the challenging *Matsuri Crashers* drum battles, which create compelling atmosphere with very few drums. More generally, the unconventional venues might provide novel inspirations and the pace of a bike-tour might encourage community within the ensemble.

Even if the CO₂ reduction plan ultimately results in reduced touring, however, I can use the change to my advantage. Less travel means more practice, and practice is one of my most productive and least consumptive activities.

With hard work and creativity, the plan can have a positive effect on my art. Artistic limits have little to do with limited resources. Music with five drums is not automatically inferior to music with ten. If I can create a healthy, fun, sustainable lifestyle, and an invigorating environment for creativity, my music should thrive.

Figure 3: Design for bicycle-tour taiko set



Proper Application of Privilege

This focus on possibilities fills me with inspiration. I see the potential to align my work with the earth and with the urgent challenge facing humanity. My music can be better for others, and more representative of how I live and what I believe. In fact, success would redefine what it means to me to be white, male, and American.

I have long been uncomfortable with my position at the top of an increasingly unequal division of wealth and power. As a white male, living in the world's most powerful nation, I am the poster-boy for privilege. The terms, "discriminated", "disadvantaged", and "under-served", refer to people other than me. I was once handcuffed in front of my apartment alongside a black neighbor due to a mistaken police report. It was clear who the LA police believed the perpetrator to be. "What are *you* doing with *him*?"

Even the larger historical context of my life grants me advantage. I am the beneficiary of the era of oil, the most abundant supply of free energy in the history of humanity. I am now tasked with the transition away from that energy.

Climate change presents me with two options; business-as-usual or personal responsibility. I can use my privilege to maintain the status quo, exploiting those who are not white, not male, and not American. This is the option favored by the remarkably irresponsible climate deniers in government and industry. Republican leaders in the US Senate, for example, continue to deny human-induced climate change, calling for increased fossil fuel production, and demanding "freedom from regulation". Institutions like the Western Fuels Association deliberately seek "to confuse the public", while the Heartland Institute develops curriculum for use in schools framing climate change as a scientific controversy. Oil companies are exploring increased offshore drilling and lobbying powerfully to gain access to the melted Arctic regions made accessible by the very climate change to which they have contributed.

I can join this team, or I can take reasonable, measured steps toward sustainability in my own life. I can tweak aspects of my career to make my touring sustainable. I can apply the vast resources unfairly weighted in my favor to design a lifestyle in harmony with the earth.

It is time to play my trump card. I will conquer my portion of the problem. I will do right by the earth. I will make my music good for us all, and I will have fun doing it. This is the proper application of privilege. It is the proper celebration of freedom.

Notes

¹<http://www.rollingstone.com/politics/news/global-warmings-terrifying-new-math-20120719?print=true>

²<http://www.reuters.com/article/2009/07/08/us-g8-summit-environment-idUSTRE5653PW20090708>

³<http://math.350.org/>

⁴How far will 2 tons go? At approximately 10mpg, a Hummer produces 2 tons of CO₂ at approximately 2,000mi, a Prius at 8,000mi, and a vegan cyclist can go approximately 200,000mi. CO₂e for vegetables is .0005lb/calorie and cycling consumes approximately 40 calories per mile. <http://fatknowledge.blogspot.com/2007/04/vegans-vs-hybrids.html> Considering the world record for miles ridden in a year is 75,065, (Tommy Godwin, 1939) a vegan cyclist could ride 24 hours per day and still stay within the 2-ton annual budget.

⁵https://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions_per_capita

⁶Car travel CO₂: total miles / 16mpg van w trailer × 19.6lbs CO₂ / num. passengers

⁷Air travel CO₂: <http://calculator.carbonfootprint.com/calculator.aspx?tab=3>. Includes radiative forcing.

⁸<http://archive.metropolis.co.jp/tokyomusicconcerts/japanbeat/347/tokyomusicjapanbeatinc.htm>

Appendices

A Questions/Criticisms

Will your changes really make a difference?

The high-stakes and daunting scale of climate change lead many to a resigned fatalism. “Even if you live a perfectly sustainable life, development in China and India will determine our future.”

I find this perspective unpersuasive for two reasons.

Firstly, our actions now are particularly significant. It is true that we have already committed the earth to some amount of warming. Atmospheric CO₂ is at 398 parts per million, higher than any time in human history and not seen on Earth for 3 million years. Even a sudden, full-stop to carbon production would not save us from the additional warming guaranteed by the current CO₂ concentration. There is nothing we can do to eliminate warming and the increased risk of mass extinctions, global food shortages, and increased extreme weather.

And yet there is no better time to act than right now. A 2-degree-warmer world looks dramatically different than one at 4 degrees. Above certain concentrations, feedback mechanisms in the climate system amplify the effects of our greenhouse gases. As CO₂ increases, negative impacts increase even faster. Thus every ton of CO₂ we limit now has a greater impact than a ton reduced in the future. We can't return to a perfect climate, but we can save the earth and human culture from the most disastrous scenario: the continuation of business-as-usual CO₂ production.

Secondly, my CO₂ production is an issue of personal morality. Regardless of outcome, *I* must act responsibly. Others' detrimental actions are not justification for my own. As an informed, empowered, free agent, it is my moral duty to act as best I am able.

This is a problem for governments, not individuals.

We should do everything we can to encourage our elected officials to act forcefully on climate change. Unfortunately, the global scale of the problem, combined with the delayed effects of CO₂, and the fact that mitigation will impact nearly every sector of the economy, makes the problem particularly intractable for governments.

The effects of CO₂ are felt globally. The atmosphere is constantly mixing, such that CO₂ released in the US has the same effect as CO₂ released in Australia. For government to solve the problem, we must see cooperation between a majority of the world's nations, on a scale that has not been achieved in the history of human civilization. The contentious climate conferences thus far have illuminated the difficulty.

Once released, CO₂ exists in the atmosphere for anywhere from 5-200 years, and the climatic response to increased concentrations is delayed by decades. Compared to the short terms of elected office, the extended time frame of climate change presents a profound difficulty for governments. Before we can adequately govern our way to a solution, we must also solve essentially difficult questions, like how to fairly represent the needs of future citizens in our policy procedures.

Lastly, climate change mitigation will effect nearly every sector of industry, complicating the task of legislation. Laws must be drafted to balance a paralyzing diversity of needs.

While I will continue to lobby my representatives for action, it seems to me that government faces particularly challenging obstacles. I, on the other hand, can act right now. One might go so far as to say that climate change is a problem for individuals, not governments.

You can make a bigger difference by traveling and reaching people through your music.

Many of my friends suggest that I should continue to travel in an effort to magnify my impact on the world. “Share your concerns with your audience. . . the world

needs you.” While I am moved by the value these friends place on me and my work, I do not believe there is such a clear link between travel and greater impact. On Ensemble’s tours have thus far been determined by schedule and finances, without consideration for “impact” or sustainability. A whirlwind tour to perform once in Japan and once more in England (as I will do this year) might only expose me to 1000 people; a low return-on-CO₂. It is possible that this carbon would be better spent in multiple, shorter-distance tours.

Quality of interaction should also a factor. Compared to the standard fly-in, hotel, fly-out approach, bike tours might allow me to form deeper relationships with those I meet.

I can’t say unequivocally that I will be able to reach an equal or greater number of people by bike, but I also cannot confidently say that reaching people *requires* carbon-intensive travel.

I am also uncomfortable using an unsustainable tour model to spread the word of environmental responsibility. The best I could say to an audience is, “We must reduce our CO₂! And by *we*, I mean *you*, because clearly I must continue to travel...” The hypocrisy undermines both my message and my art.

Your music is as valuable as anyone’s work. Why should the President get to fly and not you?

There are scientists and politicians working to combat climate change whose efforts depend on travel. There are technical developments that will require the consumption of energy and resources. Solving the climate crisis will require the production of CO₂. I consider these efforts more deserving of CO₂ than my current uses, especially my uses borne of convenience and habit.

The good news is that my artistic growth and personal happiness need not require high CO₂ production. I have the wonderful opportunity to change a few details of my career so that I can achieve my artistic goals while maintaining the environment.

The plan is too strict.

“You’re not the problem. . . you’re the greenest person I know.”

That I am better than I might otherwise be, or that I am better than the worst offenders, is little consolation for the fact that I produce 10 times more than my fair share of CO₂.

I worry instead that this plan is not strict enough. Even if I’m able to implement the reductions with perfect success and achieve my ultimate goals, I won’t be free from the blame of climate change. On my death bed, I won’t be able to say, “It wasn’t my fault.” It will have been only slightly less my fault.

Even the core calculation of my personal CO₂ budget, on which this plan rests, is likely too lenient. Dividing earth’s remaining carbon budget by the world’s current population sounds reasonable. But having been the beneficiary of decades of carbon-intensive development here in the United States, I have received an unequal benefit from CO₂ production thus far. If we’re being fair, I should get *less* carbon than someone in India or China.

Why not purchase offsets?

I do not consider offsets a viable alternative to reducing my CO₂ production. The CO₂ I produce will remain in the atmosphere for centuries. Similarly, I can’t return the fossil fuels I burn to the earth. By funding international programs with CO₂ mitigation potential, offsets are a positive force for good, especially Gold Standard-rated programs. But CO₂ production is a one-way street. Offsets do not exonerate me. They cannot be a replacement for fixing my problem.

Offsets provide a practical utility to me personally as I weigh my travel options in the coming years. The added expense of offsets will help reduce my attraction to travel for financial gain. By subtracting the true cost of carbon from my income, I can more fairly compare the income potential of travel-related work versus local work.

You're wasting the CO₂ you burned to get this far.

My shamisen teacher proposed the following argument. In all my studies, travel, and performances thus far, I have built a set of skills and a network of collaborators that allow me to do what I do. Having finally achieved the ability to perform music at a professional level, I should share that music. By limiting my travel, I'm cutting off the product of this work, and potentially wasting the CO₂ that got me here.

Like the "impact through travel" criticism above, this argument assumes that carbon-intensive travel is necessary for the utilization of the skills I have developed. This is almost certainly not the case. I might well make more of an impact through bike touring than through flying and driving.

It would be more accurate to state the following. "I have finally achieved the skills necessary to perform world-class music, plus the vision for how to align my career with the critical challenge of climate change. I am uniquely situated to implement an ambitious plan to tour sustainably by bike. All the CO₂ I've produced has prepared me for this challenge. Success will be some small justification for my consumption."

Don't take artistic opportunities for granted.

This is the plan's most piercing criticism. Thus far in my career I have tried to jump at every opportunity. I think of myself as an advocate for my music, always working to find venues for its performance and feedback for its improvement. Will I really say "no" when Carnegie Hall calls and I've spent my budget?

This fear ignores the generous buffer I've granted myself. The plan's gentle transition period and roll-over options provide a reasonable way to take advantage of opportunities that arise over the next 10 years.

More fundamentally, I shouldn't be so timid. Are the potentially-missed opportunities so compelling that I should forgo progress toward significant life goals? Am I sure it will be Carnegie Hall calling, on the east coast, and not Disney Hall, here at home? And if it is Carnegie Hall, and the opportunity were

so great, wouldn't I ride my bike across the country, instruments in tow, blogging the whole way, and make it a truly life-changing performance?

I should not ignore the potential of missed opportunity by *not* acting. Continuing with business-as-usual would cut me off from a different set of opportunities, opportunities that are probably more valuable to me. 10,000 years from now, humanity's legacy will be measured in the grandest of scales. We will be the species responsible for mass extinction, the conversion of our planet to a less-hospitable world, and the destruction of numerous wonders of human culture. Or we will be the generation who bravely changed course and saved the planet. Before me is the opportunity to be part of a positive 10,000-year legacy, in fact, to write the soundtrack for this heroic transformation. I must be brave and be myself.

B CO₂ Reduction Plan Details

- Track all CO₂ from flying, long-distance driving

For air travel calculations, use:

<http://calculator.carbonfootprint.com/calculator.aspx?tab=3>.

Include radiative forcing. Use non-stop flights whenever possible.

For long-distance driving (more than 100mi), track gallons of gasoline consumed or calculate gasoline use based on distance. On Ensemble van with trailer gets approximately 16mpg. Calculate CO₂ production at 19.6 lbs CO₂/gal.

To calculate my portion of the CO₂ (as opposed to other members'), divide CO₂ for trip or portion of the trip by number of passengers.

Note that this simple accounting method does not allow for considerations of “mutual responsibility”, where one member must fly while others drive. In the case where one member must fly in order for the group to be able to accept a performance opportunity (due to schedule constraints, for example) in all fairness, some percentage of the liability for the increased CO₂ from flying should probably be borne by all members. To account for this, one might divide the total tour CO₂ by all members equally. This procedure, however, has its own problems. It does not fairly recognize members' differing CO₂ reduction priorities. I will choose to drive whenever possible to minimize CO₂. If other members choose to fly because they value their time more than CO₂ reduction, I should not be penalized. Clearly, a perfectly accurate system of responsibility accounting can quickly become onerous. Instead, I will use the simple accounting method of dividing a driving trip's CO₂ by the number of passengers.

Travel by bus and train will not be tracked in this initial plan.

- Budget is strict

Only accept performance and personal travel opportunities within CO₂ budget for that year, no

exceptions.

Establish and maintain an “emergency CO₂” buffer of at least 4 tons (see below).

- Roll-over accepted, until 2023

If I use less than my budget for a year, I can credit the remaining CO₂ toward the next year's budget. This will help me maintain a safety buffer of “emergency CO₂” and reduce the arbitrary bias the plan gives early-year travel over late-year travel. From 2023 on, however, all roll-overs are lost and I will stick to the 1.5T annual limit.

- Offsets above 1.5T

For all travel CO₂ above 1.5 tons, purchase Gold Standard carbon offsets through less.ca or similarly reputable provider (approximately \$40/T in 2013). (See Criticisms, Appendix A)

C Yearly Tracking

Planned CO₂ use.

Table 3: KB 2014 CO₂ tracking (projected)

Year	Purpose	Notes	CO ₂ in tons	Offset
2014	Jun Japan trip	LAX→HND HND↔KUM	1.46 est .4 est	pending pending
	Jul England trip	HND→LON LON→LAX	1.58 est 1.45 est	pending pending
	Dec Vermont trip	LAX↔BBF	1.38 est	pending
			total — 6.27	
		remaining budget (10.5T start) — 4.23		
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2015	Jan cross-country tour	LA↔east coast	3.4 est	pending
			total — 3.4	
			remaining budget (9.5T start) — 6.1	

D Further Reading

Recommended online course on climate change.

<https://www.coursera.org/course/warmerworld>

Fossil fuel consumption and climate change.

http://video.ted.com/talk/podcast/2009G/None/RobHopkins_2009G-480p.mp4

Book reviews and recommendations.

<http://onensemble.org/2014/03/recent-book-reviews-march-2014/>

<http://onensemble.org/2014/03/recent-book-reviews-april-2014/>