TEMPLATE

DEVIATION REQUEST FORM

PUBLICATION DATE **11.04.2021**

Version **5.0**

A. To be completed by Gold Standard

1| Decision

1.1 | Date – 28/07/2023

1.2 | Decision

The deviation request for PoA (GS11329) and VPA (GS12142) has been approved as summarised below:

- The above-mentioned VPA is exempted from the requirements stated in Principles and Requirements clause 4.1.49 (b). Despite a delay in submitting the required documents for preliminary review beyond one year of the project start date, the VPA may still be considered eligible for certification considering the delays caused due to the methodology revision process.
- However, according to Principles and Requirements clause 5.1.37, the VPA can only consider a maximum period of two years for retroactive certification before the project design certification date for performance certification and issuance of GSVERs.

- TAC has reviewed the developer's request for an extension to the time limit for document submission, which is currently set at one year for retroactive projects. Unfortunately, the request has not been approved at this stage for wider adoption. The Secretariat is mandated to evaluate the implications of this rule change, including its impact on prior consideration requirements, beyond technology type and relevance. The Secretariat will present its findings for TAC’s consideration in a future call.

1.3 | Is this decision applicable to other project activities under similar circumstances?

No

B. To be completed by the Project Developer/Coordinating and Managing Entity and/or VVB requesting deviation (Submit deviation request form in Microsoft Word format)

2| Background information

Deviation Reference Number	DEV_468	
Date of decision	28/07/2023	
Precedent (YES/NO)	No	
Precedent details	N/A	
Date of submission	29/06/2023	
Project/PoA/VPA	Project	ID – GSXXXX
	☒ PoA	ID – GS11329
	☒ VPA	ID – GS12142
Project/PoA/VPA title	Beam Mobility – Shared Micromobility	
Date of listing	30 May 2023	
GS Standard version applicable	AMS III BM - 434_V1.0_EE_Two-and-three-wheeled-personal-transportation	
Date of transition to GS4GG (if applicable)	N/A	
Date of transition to Gold Standard from another standard (e.g. CDM) (if applicable)	N/A	
Date of design certification/inclusion (if applicable)	TBA	
Location of project/PoA/VPA	New Zealand, Australia, South Korea, Malaysia, Thailand, Turkey, Indonesia, Japan	
Scale of the project/PoA/VPA	☐ Microscale ☒ Small scale ☐ Large scale	
Gold Standard Impact Registry link of the project/PoA/VPA	https://registry.goldstandard.org/projects/details/4120	
Status of the project/PoA/VPA	☐ New ☒ Listed ☐ Certified design ☐ Certified project	
Title/subject of deviation	Technology Learning Curve Impacts on Retroactive Period Limitations for Sustainable Transport Solutions (STS)	
Specify applicable rule/requirements/methodology, with exact paragraph reference and version number	101 Principles and Requirements (PAR) v 1.2. Clauses 4.1.41, 5.1.51 and 5.1.52	
Specify the monitoring period for which the request is valid (if applicable)	Start date	End date

Submitted by	Contact person name: Ferdinand Coenraad Balfoort Email ID: ferdinand@themrp.org
	Organisation: The Micromobility Research Partnership Pty Ltd
	Project participant: Yes ☒ No ☐
Validation and Verification body (VVB opinion shall be included, where required by the applicable rules/requirements or request is submitted by the VVB).	Yes ☐ No ☒ N/A as VVB is currently preplanning Validation Audit still VVB name: Bureau Veritas VVB Staff name(s): Mr. Ram Desai
Any previous deviations approved for the same project activity/PoA/VPA(s)?	Yes ☒ No ☐

3| Deviation detail

3.1 | Description of the deviation:

**Guidance* Use the space below to describe the deviation and substantiate the reason for requesting deviation from applicable rules/requirements. Please include all relevant information in support of the request. You are requested to follow the principles for requesting deviations, given in the Deviation Approval Procedure/ Design Change Requirements.*

3.1.1 | Deviation detail (to be completed by Project developer):

The following Deviation Request is classified as an Outside Certification Review under Clause 5.2.1 of the Deviation Approval Procedures, v. 1.1.

The Deviation Request is presented under Clauses 4.1.41 and 5.1.52 of the Principles and Requirements 101 PAR Gold Standard Manual. These note exceptions may be applied for under the following conditions:

Clause 4.1.41: Note that the Project start date definition and requirements may differ under certain Activity or Product Requirements.

Clause 5.1.52: For certain Methodologies and Gold Standard Certified Impact Statements, the Design Certification Requirements for a Retroactive Project may differ.

However, the Gold Standard manuals remain silent on how to apply for approval of such warranted exceptions and hence we have been advised to apply for an exception in the format of a Deviation Request.

This Deviation Request presents the barriers and challenges to the successful and timely deployment of new and emerging sustainable technologies, specifically Sustainable Transport Solutions as referenced in Rule Update 2022 titled Application of Gold Standard Approved Methodologies – Sustainable Transport Solutions, dated **04 May 2022**.

In presenting the evidence, the Project Developer asserts that both Clauses 4.1.41 and 5.1.52 are of application to Sustainable Transport Solutions as a class, and to e Scooters specifically.

This Deviation Request is therefore evidence based and academically peer reviewed by Professor Hussein Dia from Swinburne University of Technology in Melbourne, and Professor Mark Stevenson from the University of Melbourne's Transport, Health, and Urban Design Research Lab.

Professor Dia reviewed this Deviation Request and supports this proposal to set the retroactive period for STS to six years instead of one year as currently stipulated. As noted in this request, it is challenging to establish the benefits and impacts of e Scooters over a short-time frame of one year. As with other transport innovations and initiatives, considerable time is needed for new mobility solutions to be accepted by the public, and regulators also find it challenging to stay abreast of technology developments and to introduce agile regulations without stifling innovations. Considerable time is also needed to influence traveller behaviour on mode shift from private vehicles to other modes of transport such as ride-sharing or car-sharing or in this case micromobility and eScooter solutions. This means that much longer timeframes are needed to collect data and the evidence base to support rigorous evaluation studies. A timeframe of six years would provide a more reasonable ground for comprehensive evaluations that take into consideration technology maturity and public acceptance.

Professor Stevenson reviewed the Deviation Request and also supports the proposed extended period proposed for sustainable transport systems. This is especially the case due to the long learning curve associated with technology such as that linked to established micromobility systems, and the challenge associated with the prolonged time period to attain market penetration: a necessary prerequisite for mode shifts to be observed.

The Deviation Request is divided into descriptions of different and distinct classes of barriers and challenges that cause STS and their established sustainable impacts to emerge more slowly than the standard one year defined in the Principles and Requirements 101 PAR provisions for Retrospective Periods.

The barriers and challenges in this Deviation Request are defined as follows:

I. Technology Learning Curve
II. Lead Time to Financial Maturity
III. Lead time to Adoption Maturity
IV. Lead time to undertake research and confirm sustainable outcomes of STS
V. Lead time to establish STS frameworks and Procedures

As a result of the proven delay periods caused by the barriers and challenges defined in Sections I – VI of this Deviation Request, the Project Developer and Owner jointly propose that the retroactive period for STS as a class should be set much higher than the one year as currently stipulated in 101 PAR Clause 1.4.49, which states that:

“Retroactive projects shall submit the required documents for preliminary review (time of first submission) within one year of the project start date. Retroactive Project submitted at a date later than one year from the project start date will not be eligible for Gold Standard certification.”

We propose that Gold Standard Technical Advisory Committee sets the time limit to a period greater than one year, as currently set.

I. Technology Learning Curve

The principal consideration on which this Deviation Request is proposed to the GS Technical Advisory Committee is that new technologies take significant time to prove their sustainability impacts, due to the impact of a formal concept denoted as the

"Technology Learning Curve". The Technology Learning Curve is defined as describing "Technological Progress as a function of accumulating experience with that technology". (MacDonald and Schrattenholter, 2002). They established this definition based onthe context of their research and findings regarding increased sustainable energy systems and the impact of technological change. This definition means that technology progresses and reaches mass adoption only with sufficient support for the technology to be accessible to users to learn how to optimally use such technical solutions, including Sustainable Transport Solutions. The authors find that technology learning curves vary under different market conditions, and stimuli, based on their assessment of 42 emerging energy technologies, including a significant number of sustainable (transport) technologies. A full list of such factors is noted in **Section 4, p.735** of their paper. (Ibid, 2002)

The key conclusion is that due to these factors, which are not always very clear due to a lack of underlying data, learning rates for technologies may vary greatly. In more established energy technology sectors like Oil extraction (25%), the Learning Rate may be quite high whereas in Hydropower the Learning Rate is significantly lower (1.4%). For context Solar PV has a learning rate of 20%. In other words, learning curves and rates are affected by the level of establishment of a technology in terms of time, the profitability of those technologies and the immediacy of returns. Other factors include the level of profitability margins, imposition of negative external costs, and subsidies in addition to behavioral momentum which starts slow and gradually builds as more users start to adopt a Sustainable Transport Solutions technology under consideration. Rees et al (2022) notes the slow and incremental changes in behaviour towards more sustainable transport mode choices and STS can be influenced by sudden shocks to personal circumstances (the Pandemic) but also the emerging evidence that more sustainable transport choices are not necessarily more risky or unsafe, as popular beliefs tend to be regarding the lack of safety around bicycle travel and usage. As the authors noted "statistically, cyclists are less likely to be injured or killed than car drivers. Changing people's attitudes through this evidence should create a better perception of the safety of cycling and inspire behaviour change". Significantly, safety research related to micromobility usage including e Scooters is still emerging after many years, since the data on safety for micromobility has simply not been collected in sufficient and with consistent enough methodologies (UK PACTs 2021).

As the authors note, those with limited planning horizons will tend to underinvest in sustainable technologies, including addressing of the factors included in the Author's list in **Section 4**. These are technologies where "consumers and companies, in the absence of regulatory reporting such as Scope 1-3, are likely, to underinvest relative to the long-term social interest."

In the case of Sustainable Transport Solutions, the learning rate would be considered very low due to several factors echoed in **Section 4** (MacDonald and Schrattenholter, 2002) including the fact that STS generally have to overcome a major and dominant emitting mode of transport in most countries globally, which is private passenger emitting cars. Private cars include both Internal Combustion Engines (ICE) as well as Electric Vehicles (EV), where renewable energy is not plentiful and available for a renewable recharging process. Infrastructure and any subsidization for less emitting STS technologies are patchy as many of the initiatives are launched by technology entrepreneurs under commercial conditions and challenges outlined in this Deviation request. This particularly applies to a range of STS, including e Scooters.

In 2022 a "Background paper on decarbonization technologies for sustainable road mobility" published by the CDM Technology Executive Committee set out to research and present findings on the state of STS globally, including the "technologies' social, institutional, economic and business challenges and solutions related to their development and deployment, including new market access and social acceptability".

The paper found that across all STS researched, in 2020 the majority of STS studied achieved less than 0.1% market penetration in most markets globally, with the only outlier being Plug in Hybrid EV (PHEV) at 1 – 10% depending on location (outlier being Norway at 75%) due to heavy subsidization by governments. (**Table 1 in the Background Paper**). Not surprisingly, PHEV are found to also be the highest emitting type of EV on any Life Cycle Assessment basis, approximating ICE in level of emissions. This was only established recently as a result of field studies that showed that these vehicles are effectively more driven on fossil fuels than electricity (ICCT, 2022). This level of emissions is only slowly being recognized under the growing weight of academic research and conclusions, which take significant years and a body of deployed vehicles to establish evidence based and scientifically sound conclusions on the sustainability of any different STS type.

In comparison a more established technology described in a paper on cooking stoves in Africa to support better air quality and health outcomes found that by 2011, 30 – 40% of African households already owned improved cooking stoves, and that in 2012, already 5 – 8 % of Ugandan and Tanzanian households owned clean cooking stoves.

An ITF 2023 paper on need for public intervention titled "How Improving Public Transport and Shared Mobility Can Reduce Urban Passenger Carbon Emissions" found that optimization of public transport and infrastructure could significantly increase the impact from shared mobility and double the potential switch of trips away from ICE, but **subject to government intervention and support only**. The modelling completed by ITF projected out to 2050 and noted:

"Policy measures to improve public transport combined with incentives for shared modes complement each other. Together, they shift trips away from privately owned vehicles to collective modes, resulting in an overall 4% decrease in emissions."

"Investing in infrastructure to prioritize collective and active modes increases the use of these modes. Combining infrastructure investment with improvements to public transport and incentives for shared modes results in an 8% reduction in emissions."

Note that even at this level of emissions reductions projected by ITF, the level of mode switch expressed in the percentage shift of household trips from ICE and EV would still be a significantly lower factor. This is due to the high population of ICE and EV trips currently globally, and the exponential impact from mode shifting due to the large baseline differences reported between ICE and STS. For example, the Frauenhofer Institute, reporting in 2022, noted that emissions per passenger kilometre are around 26.7 g/pkm, including error margins, based on a cradle to grave LCA analysis. The fuel phase of the e Scooter LCA is at zero if renewable energy is used or at most 5 g/pkm if nonrenewable energy is used for charging (Moreau 2020), which is around 50 times less than the average ICE tailpipe (Fuel phase) emissions as defined by manufacturers and around 100 times less than ICE tailpipe emissions on short trips replaced by e Scooters.

It has taken to 2023 to confirm the actual lifetime emissions of e Scooters when TUV Sud, one of the biggest global independent certification bodies, conducted detailed LCA studies on three e Scooters produced by the largest e Scooter producer globally, Segway Ninebot. They found that the total lifespan emissions for e Scooters range from

328 kg CO2-eq to 358 kg CO2-eq. Based on Ninebot's assertion that the e Scooters they produce are guaranteed to travel for up to 10,000 km, this would indicate a level of emissions per passenger kilometer of 32.8 – 35.8 g/pkm, which is within range of the Frauenhofer Institute, and also in a similar range to that calculated by the Micromobility Research Partnership (MRP) at 39 g/pkm (without factoring in zero rated renewable energy charging).

The key observation here is that these results have only been produced and published a full six years after shared rental e Scooters were first commercially launched in the USA. Since then, there have been significantly opposite and conflicting findings on the sustainability of shared rental e Scooters, despite the belief by operators (such as the Project Owner) that e Scooters are definitely less emitting than private cars. A search of past internet based claims from Segway at https://ap-en.segway.com/ and accessed via https://archive.org/web/ (The Wayback Machine) indicates that the company noted as far back as 2020 that "2017 – October – Segway announces the arrival of its latest product, the Ninebot KickScooter by Segway. These electric scooters, including the ES1, ES2, and ES4 models, will soon kick off the scooter sharing craze." In this period, the websites have continuously asserted that e Scooters are more "Greenly" transport options but at no point was Segway able to confirm its actual footprint, until the announcement this year in 2023. This is echoed by a similar announcement prepared for Voi Micromobility by EY, in 2020, based on 2019 based research, which was a first of its kind, but not peer reviewed.

Other UN SDG relevant contributions that are only now emerging from academic research and learning include significant other health benefits as noted and tabulated in 2023 by the ITF (Chapter 5, Liveable Cities, The Broader Benefits from Transport Decarbonization) are as follows:

"This chapter focuses on the components of liveability most affected by transport: health and safety, access to opportunities, equitable mobility, and urban space.

These four themes align with UN Sustainable Development Goal 11 (SDG 11), which calls on cities to provide "safe, affordable, accessible and sustainable transport" with an emphasis on road safety, air quality and disadvantaged populations (Hosking et al., 2022"

When the ITF initially started to review, research and report on the impact of sustainable transport switches when Micromobility, including e Scooters, were first introduced, the additional UN SDG contributions were scarcely understood due to the low level of transport mode shift to these lower emitting modes.

The Micromobility Research Partnership has been conducting independent research and has equally found significant benefits arising from the circular nature of shared e Scooter usage, air quality impacts in terms of mortalities and lifelong illnesses from reduced levels of particulates emitted by ICE and so forth. The research continues to identify new positives due to the growing, albeit patchy and slow, deployment of shared rental e Scooters globally. These additional cogenerated sustainable impacts are further described in the GS4G Methodology that the MRP co authored and published with GS in January 2023.

It is clear that these projections, which are echoed across academic research, will only be possible with the correct level of support for STS beyond the popular government subsidization for the switch from ICE to EV. Until a significant level of financial incentivization is in place by means of voluntary carbon credit monetization or other means, STS as a class will continue to struggle through a slow and uneven Technology Learning curve that will extend the learning significantly compared to more traditional technologies that are already well established in markets, including forestry, land usage, biofuels. This highlights the need for a latency period to quantify and justify what is now becoming apparent from those STS projects that were early to market. Importantly, it shows there is a significant opportunity to reduce transport sector carbon footprints, but not yet the significant uptake which will give the Return on Sustainability to those early technology adopters.

Conclusions

The one-year retroactive period from a project start date to certify is not surprising for better known and established classes of sustainable technologies including such known technologies like cooking stoves and agricultural waste to energy conversion.. Where there is a significant peer reviewed body of academic research and literature that confirms the sustainability impacts from established technologies and interventions, it is logical to observe an accelerated technology learning curve as a result. This is not found to be the case for STS which has a much higher latency rate due to the lower technology learning rates.

This difference and material variability in latency rates is because the scale and penetration of these more advanced and deployed technologies is significantly greater than STS. Accordingly, in theory and practice, any technologies with a significant lower Technology Learning rate will logically require a much greater retroactive period to account for the level of learning over the extended periods that would be required to produce evidence for reliable academic and independent studies.

The examples we have presented here show how learning increases only over time with a significant and growing body of evidence-based peer reviewed academic conclusions, which require sufficient data to provide the level of confidence in observations, conclusions, and projections over the periods of time we need to plan out in the Transport sector.

The same approach to setting of a retrospective period is therefore not deemed applicable to any and all sustainable technologies, and there is a need to accommodate interventions based on technology with lower technology learning rates.

II. Lead Time to Financial Maturity

To corroborate the assertion that STS take significant time to gestate and mature, the micromobility solutions that have re-emerged since 2017, including e Scooters, are still not considered mature in terms of adoption and financial maturity. As recently noted at the Global Operator Roundtable panel at Micromobility Europe conference (June 2023), “Reaching profitability is now the number one goal for most micromobility firms as the market consolidates”. Major reports on the sector have also documented this, including from Boston Consulting Group, which noted that shared Micromobility was still a very small segment at around 5% of the active and micromobility space globally compared to more established mobility options like bicycles.

Since the inception of Electric Vehicles as a class, popularly commercialized by Tesla, Sustainable Transport Solutions aiming to reduce transport emissions have struggled financially, based on public financial reporting to authorities including the SEC and NYSE.

The Project Owner has similarly struggled financially, from a basic accounting and financial prudence viewpoint, in line with the technology class globally, which has generally not achieved profitability to date, six years after the first launch of micromobility in the USA (2017). Their journey echoes that of the participants reported at the Global Operator Roundtable panel at Micromobility Europe conference (June 2023).

The Project Owner has raised capital three times, at Seed funding, Series A and Series B rounds. Current shareholders have demanded that the Project owner achieve a first quarter positive EBITA in 2023, which is proving elusive despite the Project Owner being one of the most, if not most, economically efficient operators in its technology class. Deployment costs per vehicle, a standard industry standard, is at about 6 times lower than its largest global comparative (Bird), but even then, profitability has proven to be elusive.

Sustainable Transport Solutions deployment to date has therefore been possible only due to repeated and extremely delayed, time-consuming capital fund raises. Round B is nearly depleted, and the Project Owner has been advised by existing investors that unless profitability is achieved for at least two quarters in 2023, preceding the Round C capital raise, chances of fully completing this round of funding will be unlikely.

Much bigger and substantially better funded micromobility operators are experiencing similar pressures, with the largest operator in Western Europe (Tier) currently seeking a sale to a larger entity (Lime or Bolt) as a direct result of its challenges in raising further capital as a stand-alone business based on media references. Other significant developments include material write downs of investments in Voi, also in Europe. Other operators are about to go under and liquidate imminently, including the operator Helbiz.

Due to delays in capital raising and in not ever achieving profitability, deployment of e Scooters has been stop / start at times, and there is significant evidence of this occurring in the PoA of New Zealand, where deployment of e Scooters has been hampered and delayed by a lack of capital to purchase the vehicles to deploy under agreements secured with city councils (VPA).

As a result, sustainability achievements are subpar, since the absence and lack of sufficient e Scooters has reduced the opportunity to switch transport behaviour permanently away from more emitting private car travel and trips. The e Scooter density in New Zealand cities, for example, is more than 30 times lower per square kilometer compared to Seoul, which is the most liberal market for e Scooters globally and hence has the highest density of vehicles by area and capita. (Table 1). This means that e Scooters are simply not available in sufficient numbers to provide the level of accessibility needed to support an enduring behavioural change that relies on such accessibility being established through the deployment of greater numbers of e Scooters. Until Policy markers and regulators lift the artificial and arbitrary caps sent on e Scooter deployment numbers, the enduring more sustainable behaviour changes will remain ephemeral, even while Auckland city planners are aiming to increase the level of usage of e Scooters by a factor of 10 by 2030 (TERP 2030). The MRP is currently collaborating with a number of prominent universities to develop a big data analysis based research to identify the optimal sustainable deployment of e Scooters, which is the first study of its kind and which is supported by NZ Transport Agency and other agencies and industry participants, as well as universities.

The resulting outcome is a significant one for any STS Project Owner. Without critical momentum at optimal levels, revenues do not achieve the level needed to generate positive net profit/ EBITA as needed for the capital raise C. At the same time, the achievement of sustainable goals in terms of emissions is also not attainable, both at Project Owner level as well as at VPA levels, where VPA governments are increasingly setting targets for the switching of private car trips to micromobility, including e Scooters. These sustainability targets will remain out of reach without a supportive increase in e Scooter numbers deployed in relevant VPA. This limited level of impact is corroborated by an Auckland City Council analysis which notes that less than 1 % of household trips are currently classified as active or micro mobility trips. Increased PT participation is also a significant segment of this achieved reduction, and the same plan envisages a significant increase in PT trips taken by 2030. (Transport Emission Reduction Plan, 2022).

The same observation is also noted in the latest ITF reporting and projections to 2050, which is a long planning horizon that reflects the level of learning required through trial and errors to ensure we reduce the hard to abate transport emissions and sector. ITF notes that "Time is running out to meet the Paris Agreement goal to limit global warming to "well below" 2 degrees Celsius above pre-industrial levels. Despite efforts by some regions to decarbonise, transport emissions will not fall fast enough, as transport demand will grow in the years to come.

By 2050, passenger demand will increase by 79% under the Current Ambition scenario and freight demand will roughly double. Under the High Ambition scenario, the equivalent increases are 65% and 59%. **Policy makers play a crucial role in breaking the link between transport demand and emissions. They must use the tools at their disposal to ensure zero- and low-carbon technologies and fuels scale up to become cost-competitive."** ITF 2023.

The challenging deployment story for STS experienced by the Project Owner is not any different to other STS technology sector participants. Following we will describe the experience of several prominent and much better funded entities in the public domain, including Tesla (EV) and Bird (e Scooters).

Tesla Maturity Journey to Financial Stability

Tesla was established as one of the first Electric Vehicle companies since the initial emergence of EV in the late 19th century in Germany, which were soon overtaken by fossil fueled private vehicles under pressure from the fossil fuel industry. The stated aim of Tesla is to produce and distribute less emitting and more sustainable vehicles compared to its fossil fueled private car manufacturers in the automotive industry. Tesla is a valid comparison to the Project Owner as it is in the Electric Vehicle technology class. EV have been listed as a priority technology in the CDM paper titled "Background paper on decarbonization technologies for sustainable road mobility", TEC 2022/24/07, CDM, alongside all of the other types of STS examples we have noted here as benchmarks and comparisons.

In addition, Tesla has benefitted from the production of a carbon credit type from its operations called the ZEV. The ZEV is a more restrictive classed carbon credit that is industry specific and tradeable between automotive industry participants only. The ZEV concept has been adopted in a number of jurisdictions since the CARB introduced the concept, due to the success the ZEV generated in switching from fossil fueled private vehicles to electric vehicles, which is the same objective established by the Project Owner since its inception. Different jurisdictions set different and relatively more aggressive targets for ZEV to induce the switch, including 2025 targets.

It is generally accepted that Tesla would not exist now if it had not been for the production and sale of ZEV to other emitting automotive manufacturers as well as the extensive Federal loans that were provided by the US Government from 2008 onwards, when the company was only producing 1,500 Teslas per annum and very much below the early adoption threshold equally. "………the Advanced Technology Vehicle Manufacturing loan program provided Tesla with $465 million just six months before the company went public. With help from the loan, Tesla built out its production facility in Fremont, Calif., and launched the Model S sedan in 2012. The company has since sold roughly 150,000 of them globally, company records show……………(Washington Post, 2017) It was also publicly noted in 2020 that "Tesla would not have been able to report four consecutive quarters of GAAP profits" were it not for ZEV. Tesla was founded in 2003. It took Tesla **17 years** to achieve overall profitability and join the S & P 500 rankings. It took a further year to achieve operational profitability by mid 2021. Tesla was supported by ZEV to survive its lack of profitability and generate revenues to expand production for 11 years, since the California Clean Air Board regulations were updated in 2012. It suggests that Tesla needed at least eight years for it to become profitable operationally and even survive.

Equally, the level of switching to EV in different jurisdictions applying ZEV type instruments suggests that ZEV type credits, including a more tradeable VER, are particularly potent in forcing sustainable change in tight timeframes.

Finally, in concordance to other emerging STS technologies, EV sustainability LCA took a significant time to develop and report, notwithstanding the clear understanding by stakeholders that EV are sustainable, as well evidenced in public discourse and academic journals. This suggests the Technology Learning Curve for the STS type technologies is extensive and in line with other complex green technologies. Tesla only published its first LCA results in its first ever 2018 Sustainability report. A recent announcement by Ricardo that they are now engaged in developing a globally applicable comparative EV LCA study with material funding support from the EU and UK governments well noted that "There is no single life cycle assessment (LCA) standard for zero emission vehicles (ZEV) and batteries currently. What problems does this create for vehicle and battery manufacturers?" Considering the length of time since Tesla first launched its Tesla models almost twenty years ago, it is disturbing to find that an accurate academic study based and rigorous LCA comparative has still not been developed for reference to ensure government policies and certifications accurately reflect the actual sustainability impacts from EV. Not surprisingly, the article notes this will be a "30 month project, that is scheduled to finish in June 2025". The timeline and effort required is not dissimilar to the time it has taken for the Project Developer to develop a robust peer reviewed model for emission reductions when comparing light EV to other modes of transport, in order to support the certification of the referenced project.

Bird Maturity Journey to Financial Stability

Bird was one of the first shared rental micromobility operators globally, founded in late 2017, and one of the first to launch shared e Scooters in the USA and globally. This was after a hiatus of 100 years since the first historical e Scooter was designed and patented, including the German Velocipede and the American Autoped, patented in 1916. Bird is therefore a very useful benchmark for the Project Owner, in terms of the financial additionality credentials.

Bird was valued at unicorn level of valuation (US$ 1 billion) within six months, after significant high-profile investments. They required the level of investment due to ambitious deployment and expansion plans globally, which as noted takes significant capital before any revenues and profits commence flowing. In May 2021, during a SPAC listing, Bird was then valued at US$ 2.6 billion.

In the event, the original Bird organization was never profitable by accounting or other measures. In 2022 it ran out of liquidity and precipitated a hasty merger with another party that needed to inject significant million-dollar funds to keep Bird afloat, which valued Bird at US$ 48 million. Bird had literally crashed and saw a shareholder value erosion of 98.2%.

If Bird had crashed as anticipated, the emissions increase from that crash would have been equally significant since Bird at the height of operations was the biggest operator in the world with around 110,000 micromobility vehicles globally. The discard of its infrastructure would have easily negated all its positive emission reductions in its brief history. Based on MRP and Project Developer calculations, each e Scooter LCA footprint prior to usage phases amounts to 390 Kg of CO2-eq, which has been further confirmed by TUV Sud in its first LCA certification of e Scooters globally in 2023. This amounts to nearly 43,000 Tonnes of emissions in total.

Bird's latest results claim to show profits, but the assessment of those profit credentials is doubtful. We do not believe Bird is profitable despite the ongoing capital injections it is receiving to stay alive. This includes what is effectively a reverse takeover that was recently announced to have been completed. Bird would therefore be a prime candidate to benefit from VER revenues to simply show profitability and increase confidence from its investors that it can stay alive and operate sustainably, both in emission reductions and financially, similar to the successful pathway to sustainable financial operations shown by the Tesla example.

In conclusion, these two examples clearly show the impact of carbon credits on the performance, survivability and sustainability of EV technology companies. Without support from VER revenues, and significant initial support from government loans, the light EV / Micromobility industry will not sustain itself as a class. As public articles show repeatedly, micromobility companies in general are still not profitable. External audit opinions are emerging with going concern issues, suggesting a significant number of these companies will not be around in one year, due to the downturn in appetite and heightened sense of risk by technology investors in 2023.

Without VER revenues to turn their fortunes, electric scooters could well return to where they foundered 100 years ago, and instead stimulate the continued private car addiction which then occurred globally, causing the massive transport emissions we see today. Financial additionality is therefore global, across the whole micromobility industry.

Conclusions

Thus far, STS type companies have struggled to prove any standalone commercial viability, based on these two examples. In Tesla's case, only massive subsidization via ZEV allowed the company to survive and even then, it took up to 17 years to become profitable operationally.

Shared rental e Scooter operators, on the other hand, do not benefit from any subsidies anywhere globally, receive no government loans to assist them in their current start up phase prior to greater sustainable adoption, and have had to deploy and expand on internally generated cashflows for longer-term returns in the face of regulatory and policy-imposed barriers.

It is not surprising therefore that only very few e Scooter companies reporting profitability have been uniquely focused on one small market with attendant lower regulatory barriers, a unique coincidence as it turns out globally.

The fact that these isolated instances are profitable in such a small measure confirms that STS like e Scooters cannot currently be deployed profitably at scale to reach their emissions reductions potential, even though the Project Owner and some other operators in the industry sector have long proposed the sustainability of e Scooters, without the level of independent evidence and corroboration. We describe the barriers to deployment and adoption in the following section.

III. Lead time to Adoption Maturity

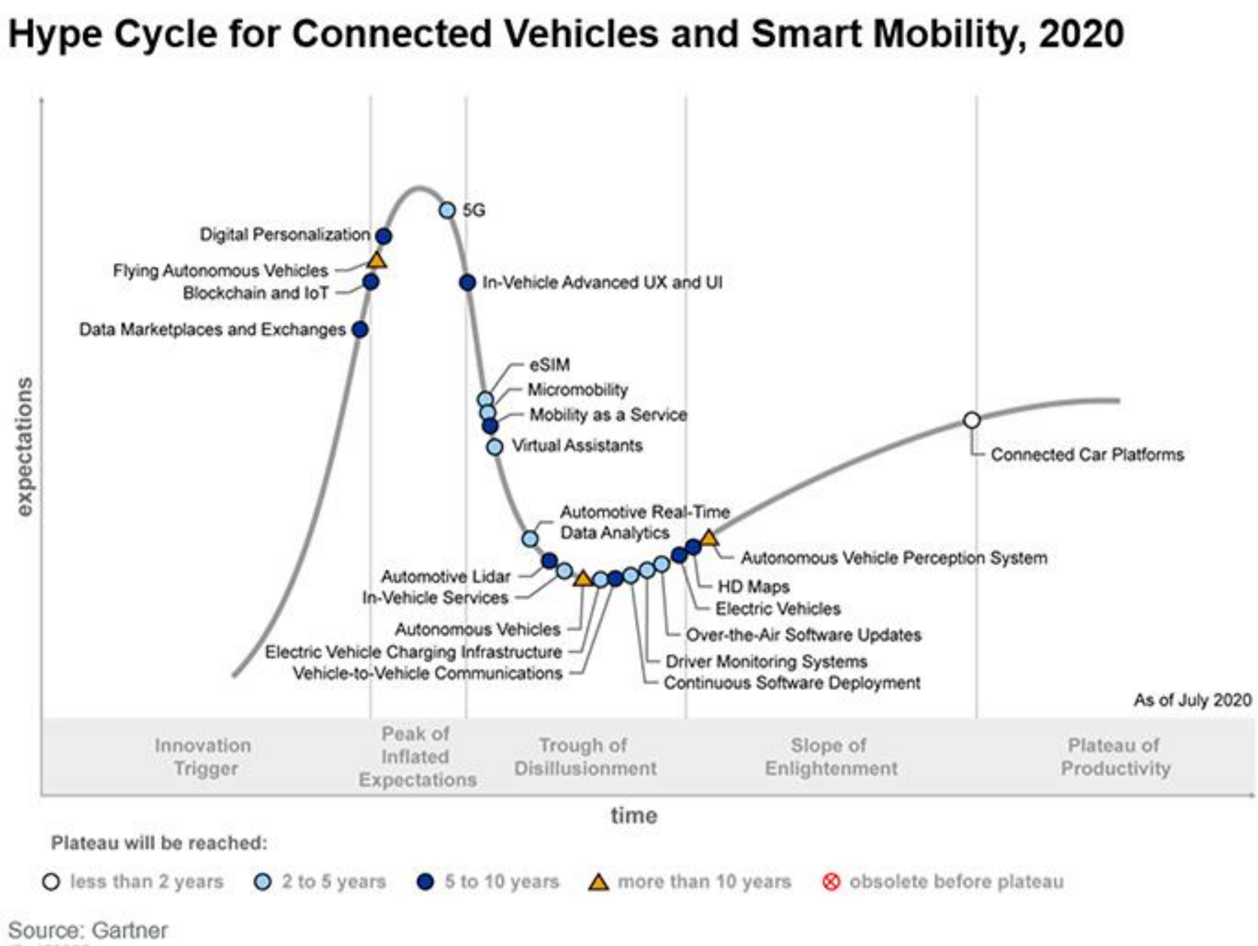
"Diffusion of Innovation (DOI) Theory, developed by E.M. Rogers in 1962, is one of the oldest social science theories. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behavior, or product. Adoption means that a person does something differently than what they had previously (i.e., purchase or use a new product, acquire and perform a new behavior, etc.). The key to adoption is that the person must perceive the idea, behavior, or product as new or innovative. It is through this that diffusion is possible." (Boston University School of Public Health, 2023).

Subsequent studies of technology types and geographies have shown that the time to achieve certain levels of adoption are variable and significantly so. The aforementioned

Global Operator Roundtable panel at Micromobility Europe conference (June 2023) noted that adoption may also be hampered by local rules and regulations, which reduces the level of deployment and financial maturity. For example, the South Korean operator Swing stated the following: “Swing has been able to achieve economies of scale as the regulatory environment in South Korea does not put any restrictions on fleet sizes. Today the firm operates over 100,000 e-scooters. “If we had to operate only 1,000 or 2,000 vehicles in only one city, we couldn’t make profits,” says Kim.

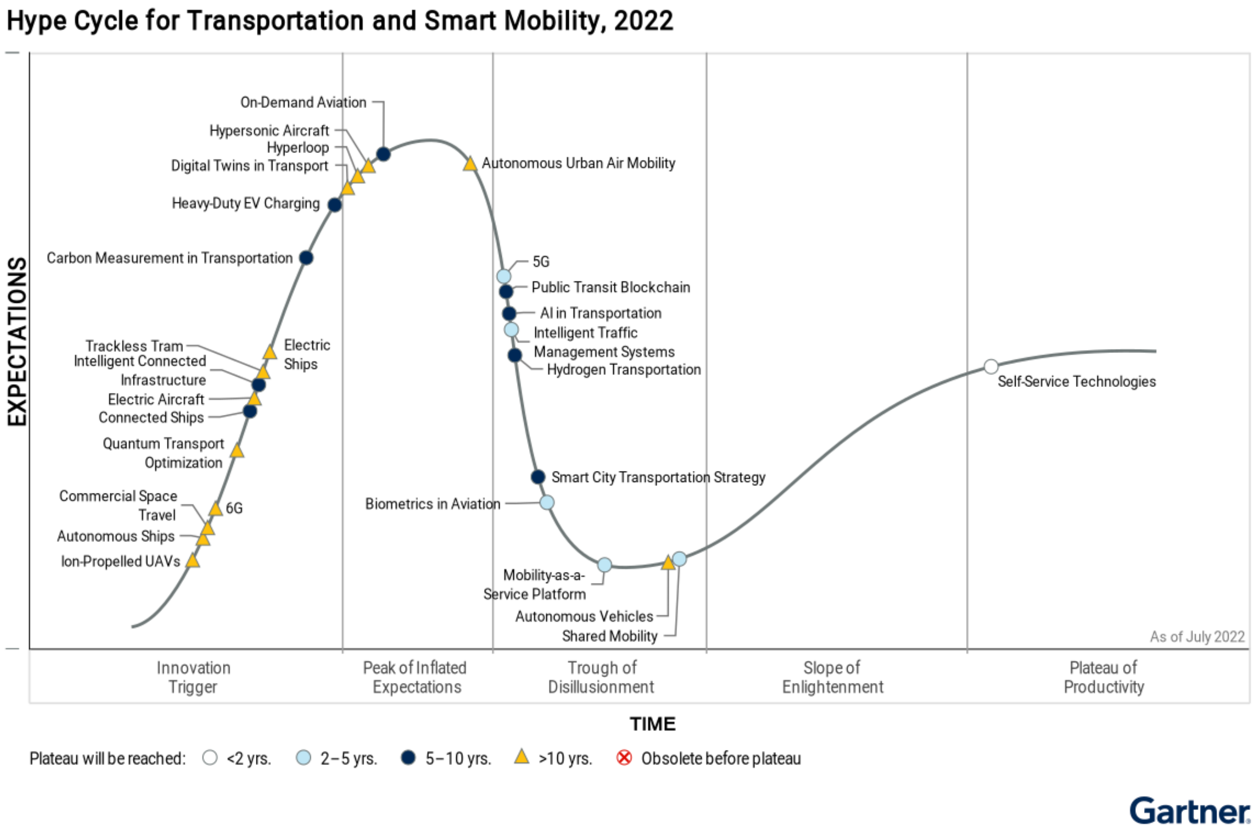
This echoes the experiences of the Project Owner. Adoption of e Scooters has been limited to well below the Early Adopter stage defined by Rogers (1962) due to the fact that most jurisdictions, apart from South Korea, have set limits on vehicle deployments, often at very low levels and within exacting geofences to limit accessibility and usage to some areas of cities only. In addition, as the Boston description of Rogers curve notes, the model is extremely limited in cases where “It doesn't take into account an individual's resources or social support to adopt the new behavior (or innovation).”

Another important source of insights is the Gartner Hype Cycle. The following snapshots address a number of emerging technologies including micromobility.



In the 2020 Gartner Curve, three years after initial introduction, Micromobility and MaaS are both are heading into the Trough of Disillutionment.

In the same curve dated 2022, Gartner assigns shared Mobility (Micromobility) a slightly better rating, and it is moving out of the Trough of Disillutionment. The same assessment in 2022 also notes however that it will likely still take two – five years for the STS category to break through to stability and plateau. To corroborate this assertion, CDM 2022 noted similar regarding MaaS and Shared Micromobility equally.



Individual e Scooter users are in fact prevented from greater levels of behavioural change due to limited resources, and limited social/ regulatory support in the form of caps set by city governments, and the consequent concentration of e Scooter deployment in inner cities. Accordingly, as BCG notes in its report "Socioeconomics and cultural attitudes also play a role in micromobility adoption. As income rises, so does micromobility use, across all modes. The differences in use among low-, medium-, and high-income residents are most pronounced with e-scooters and e-mopeds. In fact, we find that affluent young people are big users of micromobility (often for transportation when public transportation is infrequent or not running). Cultural differences can discourage micromobility use. Lower-income residents are typically less inclined to use micromobility, and not always because of cost. Cultural differences can discourage use, as well. In some cities, the reason is simply lack of availability. Providers of shared transportation modes stick to serving city centers where they can count on high usage and where serving densely populated neighborhoods is more economically efficient."

As a result, there is a sub optimal and poor level of deployment of e Scooters globally due to five key drivers and/or barriers, which are limitations caused by the:

1. Technology Learning Curve
2. Rogers Diffusion of Innovation Theory Limitations
3. Gartner Hype Cycle dynamics
4. Socio/ Regulatory barriers and limitations
5. Absence of financial viability to reinvest in addressing the first three barriers.

Globally, this has led to a very varied picture and pattern of micromobility adoption in cities and countries.

As noted earlier, there is significant academic evidence that e-scooters can reduce transport emissions in any city or country of deployment, in addition to other UN SDG contributions. A recent study in Germany found that, due to the relatively high level of e-scooters deployed in that country compared to other EU countries, e-scooters could switch as much as 2% of all internal combustion engine (ICE) trips nationally. The authors find that this switch could result in as much as 1.3% contribution to reduce transport emissions nationally. (Germany, 2022). Their estimate was based on an estimated 120,000 shared e-scooters operating in Germany (2021). That number has now increased to 150,000, spread across 86 German cities. Berlin has the highest number of shared e-scooters (30,000) followed by Frankfurt (20,000). In comparison, Stockholm (Sweden) recorded 21,000 deployed vehicles (DV), which has been reduced to 12,000 DV after more stringent regulation was introduced in 2022.

Logically, the emissions reduction potential of e-scooters to contribute to emission reduction targets is directly tied to the availability of e-scooters and other micromobility vehicles. In turn, this is also related to the parameters under which e-scooters are deployed, including licensing caps in cities, and policy settings.

There are no international models to calculate optima for e-scooter deployment, based on the MRP research. The MRP has developed and is certifying an advanced model to calculate Deployment Density ranges for cities with several collaborating universities globally, including University of Technology Sydney (UTS). One reason for the paucity of developments in this space is the complexity of calculating such optima, and the limited availability of data and variables to drive modelling.

Internationally, practical deployment numbers of e-scooters vary. Estimation and definition of deployment ranges can be based on populations, area or an alternative approach, which is to calculate deployment density on the basis of emissions reduction targets.

Population basis estimation

Independent research commissioned by the Project Owner from the MRP has found that the numbers of shared rental e Scooters deployed can range from around 2 e Scooters in cities with fixed limits to e Scooter deployment, and up to 40 e Scooters per 1,000 capita (adult, over 18 years of age) in cities where there are no limitations on e-scooter deployment, and where the market determines optimal deployment. For example, in Seoul, South Korea, we find that e Scooters reached a peak of 72,000 which reduced to 55,449 vehicles deployed after the introduction of stricter regulations (Seoul City Hall, 2022). This works out to a rate of 7 e Scooters per 1,000 adult population in Seoul currently, from a peak of around 10 e Scooters/ 1,000 capita in 2021. In Germany the equivalent rate is around 10 e Scooters/ 1,000 adult population currently.

In Stockholm City, the rate was around 29 shared rental e Scooters/ 1,000 adult capita and has been adjusted down to around 16 e Scooters (2022) with greater regulation.

Area based estimation

An alternative approach to calculating optimal deployments is to work out the density of shared e Scooters in a city. Momentum Transport Consultancy (2020) took this approach, based on surveys defining satisfaction of users with availability, and calculated that with 15,000 e Scooters deployed in Paris at the time of the satisfaction surveys, this worked out to around 142 e Scooters/ sq km. The range of e Scooter/ sq km in France was found to be between 14 – 142. The MRP has found that city deployments in New Zealand range between 1.5 - 3 e Scooters/ sq km. In the case of Stockholm City, the current rate is 64 e Scooters/ sq km, dropping from around 112 e Scooters (2021). Area based estimates therefore echo a similar trend, whereby relatively relaxed, lower regulation and uncapped cities of deployment tend to record significantly higher numbers of e Scooters deployed compared to cities where regulatory caps are maintained.

It must further be noted that neither the Population nor the Area based DV Density assessments factor in the availability and accessibility to privately owned e-scooters, which are by and large not monitored, reported on nor quality controlled to any great degree.

Table 1 – e Scooter deployments in selected cities globally as at 2023

City	Total Shared e Scooters (DV)	Surface Area CBD (Sq km.)	Per sq km (CBD ops.)	Adult Metro Population (2021) (1,000)	Per 1,000 Adult capita (adjusted for area of ops.)	Year
Auckland	1,500	607	2.5	1,300	1.5	2021
Berlin	30,000	891	34	3,769	8.0	2021
Frankfurt	20,000	248	80	941	21	2021
Paris	40,000	105	381	1,729	23.1	2022
Seoul	72,000	605	119	7,622	9.4	2021
Seoul	55,449	605	92	7,622	7.3	2022
Stockholm	21,000	188	112	780	26.9	2021
Stockholm	12,000	188	64	780	15.4	2022

Active Mobility Infrastructure Based Estimates

Based on Paris, Copenhagen and Amsterdam examples, public infrastructure for active and micromobility may identify significant trends once calculated. MRP is currently working on these analyses in collaboration with UTS in Sydney and other academic institutions globally.

For example, in the current PoA (New Zealand) and VPA (New Zealand cities deployed) due to financial as well as regulatory barriers described, adoption of e Scooters is very low, and well below the Early Adopter threshold set by Rogers (1962, 2.5%) as further defined by AMS III BM (1.5%). This means the sustainability contributions in emission reductions in the Transport sector and other targeted UN SDG are currently suboptimal.

The level of private car and van trips in New Zealand (PoA) for the 2022 reporting cycle was approximately 5.3 billion trips and is growing at a rate of around 4 % per year, based on official NZ Statistics Household Travel survey reporting for 2022.

Clause 5.4.2 (c) of the Methodology AMS III BM, Two and Three Wheeled Personal Transportation, published 13 January 2023, states that additionality is deemed automatic where:

"Activities that are type 7, 9, 10, 11 (i.e., introduction of e-bikes or e-scooters) and the market (penetration) of e-bikes or e Scooters in cars in use in the city is below or equal to 1.5% based on number of annual car trips undertaken in the city or based on stock of cars."

A 1.5 % substitution threshold for automatic additionality determination would require 79.5 million e Scooter trips to be taken in the PoA across all VPA. Total estimated Beam e Scooter trips in 2022 were only estimated at 1.85 million (Project Owner data 2022), representing 0.03 % of all car trips in New Zealand. This is approximately 50 times lower than the Methodology thresholds prescribe.

Official NZ Statistics Household Travel survey reporting for 2022 shows the real case VPA (Auckland) reported 1,628,000,000 car trips (NZ Statistics Household Transport Survey 2023). Aggregated back-end reporting showed trips on all operator e Scooters in Auckland equated to 0.29%, which is five times lower than the car trip threshold established in the Methodology, for all operators in the Auckland VPA.

Current e Scooter deployment limits in NZ VPA mean that the level of annual trips by e Scooters for all operators in all VPA and in the PoA are currently not more than around 20% of the 1.5% substitution threshold. It is likely this will remain the case until individual cities (VPA) allow greater numbers of e Scooters to be deployed, which is one of the objectives for the project GS certification to be achieved.

For example, a New Zealand study published by the NZ Transport Agency (NZTA, 2020) found that e Scooters could potentially switch between 1.6 – 5.7 % of all car trips, depending on a number of variables and specific to New Zealand, and specifically in CBD areas of New Zealand cities. This correlates to the aforementioned German study on shared e Scooters , although care must be taken to compare an actual emission reduction assessment, based on deployed DV numbers, with a hypothetical range proposed by NZTA. The NZTA study was based on big data analysis of transport modes and trips available from a New Zealand database and is shared e Scooter centred due to the absence of private e Scooter data and insights noted by the authors.

An alternative approach is to take the emissions reduction goals and desirable switch percentage from available public plans. The TERP 2022, published by Auckland Council targets a 16% switch of all car trips to micro and active mobility by 2030 to support a significant emissions reduction commitment by 2030. This includes walking trips targeted to reach 3 %, and a targeted 8 % of switched household trips by e Scooters and e Bikes. TERP 2022 does not itemize the percentage switch for e Scooters. It is safe to assume that the mix will include a 4 – 6 % of e Scooter trips.

To calculate the equivalent contribution to emissions reductions, it is necessary to obtain household travel statistics by transport mode and distance, then reduce the population to a replaceable target market for trips and distances. An estimated total deployable e Scooter ceiling can then be calculated, although this number is a grand total for any location without factoring in transport flows and variability in such transport demand and flows.

Using this approach MRP has calculated Auckland City could support up to 33,333 shared e Scooter to allow for a maximum and efficient switch of ICE trips to shared e Scooters. This calculates at around 29 e Scooters/ 1,000 population as at 2030 (TERP population forecast). On an area basis, this calculates at around 31 shared e Scooters/ sq. km. Note that both results are in range of population and area-based ranges, using a different approach working back from target emission reductions and transport mode switches desired.

Conclusions:

Based on our global research and conclusions e Scooters are not achieving the potential emission reductions projected by various agencies and institutions globally even after six years since they were first deployed in 2017. As discussed, this is attributed to a number of factors.

At the same time a growing body of evidence suggests that city planners consider micromobility including e Scooters to have significant potential to reduce transport emissions in their cities, which is reflected in a growing range of target switch percentages away from more emitting transport modes.

Expectations cannot be met without further support and subsidization from agencies and voluntary carbon emissions reduction credits generation to increase financial viability and the ability for operators to support in changing transport behaviours permanently, based on accessibility and availability of sufficient numbers of e Scooters.

A one-year retrospective period for certification purposes does not reflect the realities faced by most STS project owners, including e Scooters, as will be explained in the following section.

IV. Lead time to research and confirm sustainable outcomes of STS.

The recent announcement by TUV Sud and the global manufacturer of Ninebot e Scooters, Segway, which the Project Owner deploys, is evidence of the long lead time to conclusively and independently research and confirm sustainability ratings of any STS.

The announcement notes that this is the world's first independent certification of e Scooters, after a full six years since the first shared rental e Scooters were deployed in the USA.

Although STS operators like Voi and Lime have also previously proposed e Scooter emission credentials these have been challenged in the past due to a perceived lack of academic rigour. For example, Voi, an e Scooter operator in Europe, found a 35 g/pkm in their 2020 study conducted by EY Denmark, but since this was a paid for study and not peer reviewed, the results have been challenged academically.

There is therefore a significant gap between the time an STS technology emerges and the moment when it is possible to confirm confidently that the STS is making a net positive contribution across UN SDG and does not result in negative externalities that would negate such positive contributions. It is therefore challenging and time consuming to scientifically prove that studies are reliable and are based on research using the level of data required to create the confidence required by CDM and GS4G.

The traditional academic publication process, peer reviewed, takes up to three years. The arduous staged process is explained in detail by Elsevier, a major academic publisher. Some academic research has focused on the lead time for any article to be published scientifically, and we have found this is generally seen as a barrier to scientific progress. As Maggio et al (2020) noted, “Researchers have criticized the lengthy timeline from the submission of a manuscript to its ultimate publication, highlighting its detrimental effects to the overall progress of science” The authors also noted impacts on the researchers, scientists and patients, not dissimilar to the level and complexity of research needed to support the sustainability credentials of STS, including e Scooters, and their proven impact on public health, for example. As Maggio (2020) also noted: “While such delays may negatively affect patients, scientists may suffer as well. Researchers have noted that lengthy publication timelines can be detrimental to scientists’ careers, leading to delays of promotion and tenure and/or failure to attain grant funding (e.g., due to scientists’ inability to reference their research under review)”.

Anecdotal evidence based on personal experience of the Project Developer suggests a lead time from first submission through peer review and then publication may be as long as two - four years. This elapsed period is purely from the time a draft is ready for presentation at various academic symposia to develop arguments based on academic peer feedback. It does not factor in the preceding period of research required to develop a scientifically rigorous and evidence-based series of arguments and conclusions.

Any published articles and benchmark studies thereafter influence other academics who will dedicate their own period of research to develop their research and publications, also peer reviewed. It is hence quite normal to see results that date back up to five years still being confirmed as relevant academic sources to be relied on in terms of attributing sustainability to a technology, or even the reverse. The following example confirms the challenges of academic lead times to publication and their impact on STS deployments and GS methodology development and certifications.

The Project Developer, in the course of developing a robust academic literature review to ensure e Scooter sustainability credentials and externalities are aligned with Gold Standard principles and methodologies, spent a significant period of time undertaking research, perusing over 200 academic articles in the process, to form a conclusive opinion on the emission reductions potential and contributions to other UN SDG that were achievable with e Scooters replacing other more emitting modes of transport.

This detailed research and analysis of the sustainability impacts of micro-mobility was then the basis from which to analyze the findings from an academic paper published in Transportation Research Part D, "Mode choice, substitution patterns and environmental impacts of shared and personal micro-mobility", v102, 2022, by authors Daniel J. Reck, Henry Martin and Kay W. Axhausen. (The Study). In their study, the authors used a large dataset with matching GPS tracks, booking and survey data. The authors concluded that private e Scooters and e Bikes emit less CO2 than the transport modes they replace, while shared rental e Scooters emit more CO2. Our analysis reveals limitations with the underlying data used to arrive at these negative conclusions, significantly due to the fact that academic sources used date back as far as 2019.

These older data sources were found to be significantly out of date leading to invalid representations of the GHG emissions produced by shared rental e Scooters widely in operation today, including in New Zealand. Specifically, we found the micro-mobility vehicle models used as a basis for calculations were not reflective of current models. We also found significant ambiguities with the classification of micro-mobility technology generations, as well as with the calculation of comparative transport mode baselines.

For example, the authors referenced data from ITF 2019, a landmark study that has underpinned many other studies since. After significant research and analysis, it became clear that the older e Scooter models used as a basis by ITF suffered significant technical limitations including their lifespan. The Study relies heavily on a table of Life Cycle Assessment results drawn from an International Transport Federation (ITF) study published in 2020 called "Do new mobility services improve environmental outcomes". In this study, ITF compared a wide range of transport modes replicated in, and adapted from, the ITF (2020) report. These comparisons formed the basis from which Study conclusions were then developed.

The first issue identified by the Project Developer was that the emission footprint and comparative in the 2022 Study was based on First Generation shared e-scooters identified in Figure 7 (ITF 2020), essentially models dating to 2019 and prior, which are known to have suffered significant technology weaknesses, short lifespans and equally significantly, materially lower lifespan mileages that skewed the final LCA results in g /pkm.

The authors of the Study hence calculated that shared rental e-scooters emit 107 g/pkm based on a lifespan of 1.9 years. The lifespan of 1.9 years was derived from the ITF Assessment Tool referenced in ITF. In the ITF 2020 Assessment Tool, on the tabs detailing the technical specifications of First and New Generation e Scooters, ITF has stated its estimated lifespan is based on "Operator value: includes changes, repairs, replacement of some components (accounts for vandalism and theft)". The Operator referenced is not identified, not their geography of operations or the model of e Scooters they operate, to confirm which generation e Scooter is specified.

Current e Scooters operated are of a newer generational class, are significantly more robust, and because of independent certification conducted by TUV Sud, are capable of distances of up to 30,000 km, as certified in 2023. The Study notes that ITF 2020 reported that shared e-scooters reach a higher mileage (2,900 km per annum) than private e-scooters (2,200 km). This is for older e Scooter models dating back four years by now, and significantly less than what can be achieved today. Since the total lifetime LCA impacts found by independent certifiers like TUV Sud are based on lifespan mileages to calculate the total mass of CO2 equivalent emissions, a lower lifespan mileage is significantly unfavorable to e Scooters as a result.

It is noteworthy that even 2023 studies as a result still reference potentially unfavorable sustainability impacts from shared rental e Scooters, due to the long cycle time of academic research and publishing. Significantly, once academic research finally converged and consistently confirms the sustainability impacts from any STS, it is still then a question of developing a suitable Gold Standard Methodology for approval and publication. In this project's case it took 10 months to do so after the initial 18 months of academic research, and we understand it can take between two – five years to even elaborate the Methodology for other emerging STS technologies. In our case we relied greatly on the MRP which also took time to establish and build into an independent not for profit global research institution to research STS and develop suitable Gold Standard approved methodologies. The Project Developer would recommend a similar approach for any Gold Standard methodology development, since it requires broad consensus from academics and independent verifications to ensure any STS be admitted as being sustainable, on the basis of robust academic research and independence and long lead times that on the other hand impact on the retrospective lead time it takes for any STS to be confirmed to meet Gold Standard principles.

Equally, the prevaricating and uncertain conclusions on e Scooter sustainability impacts and externality definitions also cause a significant reported stop start type of policy decisions at council levels globally, including in Paris lately. A recent article notes that past bans on e Scooters have often not been evidence based nor data driven, and based on public opinion. Equally, the article notes the challenges in the past where exact data has not been available to support better evidence based decisions, resulting in a stop start process for shared rental e Scooter deployments in many cities globally, and thereby affecting the achievement of many relevant UN SDG goals of note potentially.

Conclusions

It is not until a sustainable technology is deployed in sufficient numbers to generate evidence-based insights through data on behavioural change that academics can start to study and conclude on the actual UN SDG impacts, both positive and negative.

Equally, studies of significant behavioural shifts can then only identify barriers to more sustainable transport technologies (STS) including MaaS, shared transport modes, fleet management technologies like telematics and Internet of Things data sensor technology devices, and EV (See CDM paper with confirmations as at early 2022). The following section will touch on some of these other STS.

V. Barriers to other emerging STS technologies

If all STS were to be denied retroactive certification after one year, very few if any STS would ever make it through the process of certification and compliance under the current one-year limit principle and rules. This is because of the extended time to develop technology, implement it, collect data, establish scientific and independent opinions on the data, publish and then develop a robust methodology with independent academic peer review.

As noted above, the process of academic research to develop robust insights and evidence-based conclusions requires significant deployment of technology devices and vehicles to collect the level of data required to conduct research at the level of confidence and accuracy also required by Gold Standard and CDM.

In a commercially competitive environment, sourcing and securing the data is very challenging due to the exacerbated competitive environment that is created under sub optimal financial conditions. The MRP is a conduit to facilitate academic collaborative research on STS, and our experience shows that data collection can be hampered due to competitive constraints and resourcing of critical data engineering functions while STS operators and founders are still at an early stage of deployment, and still unprofitable.

It is only reasonable to conduct any gap analysis on pre existing CDM and GS4G methodologies after completing a period of robust and peer reviewed academic research. Since this research can only be conducted with funding and through access to live data, the period of pre research can take up to two years, subject to data being available or accessible.

With these barriers in place, and in the absence of any reasonable pathway to comply with the Gold Standard one-year retrospective period from the start of any STS project, many of the promising technologies noted in the CDM white paper would never see the light of day, to emerge as valid and emission reducing technologies. For example, Mobility as a Service (MaaS) is not profitable by any stretch, anywhere globally. Most MaaS are sponsored and subsidized by local councils or associations, transit agencies and so forth. These agencies are not aiming to be profitable but are instead focused on expanding inclusive access to sustainable mobility. Accordingly, they do not judge success by financial results but rather on the basis of achieved modal shift, carbon emission reductions and metrics regarding inclusive access to alleviate transport poverty and improve accessibility.

Noting these drivers of MaaS it is clear that proponents of an STS like MaaS concur with CDM that MaaS can have a significant impact on emission reductions. However, to the knowledge of this Project Developer, no one globally has as yet been able to confirm the exact sustainable impacts of MaaS based on academic peer reviewed research, since a similar emergence in around 2016. There is hardly any academic literature available globally on this topic, even less than for e Scooters and micromobility. Yet there are multiple challenged MaaS projects globally that would fall outside the provisions of the Gold Standard retroactive provisions purely for launching and trialing their projects for sustainable purposes.

While technology developers may well see the positive perspectives for a technology and interested to launch and accrue VER, under these circumstances it is very challenging to do so within one year from official start of the project.

If such promising and /or proven STS were to then fail due to the lack of financial support from VER, unable to sustain themselves based on normal operating circumstances and regulatory or infrastructure barriers, this would be counterintuitive and counterproductive, leaving the status quo in place instead i.e. autocentricity.

Since GS has been established to promote the production of emission reduction credits etc. references needed this counterintuitive result would not be aligned with its mission.

It is explicit in the principles of promoting Sustainable emission reducing technologies that those should be assisted.

Conclusions

Any Sustainable Transport Technology (STS) suffers the same barriers to successful and long-term success without access to subsidies, including Gold Standard VER.

In the advanced STS space, technologies can take a similar period to gestate and prove themselves to e Scooters. MaaS is extremely data driven and able to provide the level of data on mode shift and behavioural changes needed to support sustainability claims and Gold Standard certification, but this data will not emerge without financial support.

VI. Lead time to establish STS frameworks and Procedures

The novelty of the STS project is inherently the fact that the technology category, shared rental e Scooters, required a methodology re-write, and that the project is a first of its kind under this new methodology. (AMS III BM). The updated methodology was only published on 13 January 2023, two years to the date when the Project Initial Note was first submitted to Sustain Cert on 09 February 2021 and confirmed to be suitable for certification.

The recent successful Listing after Preliminary review on 30 May 2023 nearly took five months since the Project Developer first contacted Sustain Cert (SC) for clarifications ahead of a Listing submission on 03 February 2023 as a result of inconsistencies found, related to our first of its kind novel transport technology project, shared rental e Scooters.

Shared rental e Scooters are in the classification of Sustainable Transport Solutions (STS) as defined in GS Rule Update 2022, and as agreed with Sustain Cert and Gold Standard.

However, GS manuals and systems have not been updated for an STS classification, since the issue was first noted and communicated to GS in March 2022. There are as a result no STS specific manuals setting out definitions or requirements for STS.

In the interim, the closest project typology suggested by SC and GS was CSA. However, STS does not comply with any CSA definitions or circumstances. It was agreed that would be inappropriate to apply the CSA definition and classification to the Project in either Substance or Form. The process of determining this has taken two months.

The Project Developer believes that more such novel technology projects will be presented to Gold Standard in future, as the pressure to find high quality reliable and permanent emission reducing technologies mounts.

The Project Developer therefore believes that until the STS category is fully developed by GS with appropriate updates to manuals and systems, the next best designation for the project is “Others”. This is how the technology category has now been defined after extensive discussions with SC Certification Officers.

Depending on the types of technologies and complexities, others of these STS technologies may present similar challenges to meet current timelines for submission of project documentation within the standard one year from project inception, as defined by 101 PAR. These other STS include, inter alia, Mobility as a Service (MaaS), fleet and car telematics, internet of things and data sensor driven technologies (IoT) and so forth.

Summary Conclusions

As a result of the proven delay periods caused by the barriers and challenges defined in Sections I – VI of this Deviation Request, the Project Developer and Owner jointly propose that the retroactive period for STS as a class should be set at six years instead of one year as currently stipulated in 101 PAR Clause 1.4.49, which states that:

“Retroactive projects shall submit the required documents for preliminary review (time of first submission) within one year of the project start date. Retroactive Project submitted at a date later than one year from the project start date will not be eligible for Gold Standard certification.”

We propose that Gold Standard Technical Advisory Committee sets the time limit to six years or at least a period greater than one year as currently set.

“Retroactive projects shall submit the required documents for preliminary review (time of first submission) within **six years** of the project start date. Retroactive Project submitted at a date later than **six years** from the project start date will not be eligible for Gold Standard certification.”

3.1.2 | VVB opinion (to be completed by VVB, if applicable):

**Guidance* If required by SustainCERT or Gold Standard for this particular deviation, please add here the VVB's opinion.*

N/A, VVB is currently in pre planning phase to familiarize with STS technology before starting Validation Audit.……

3.2 | Assessment of the deviation:

**Guidance* Use the space below to describe how the deviation complies with the requirements, and, where applicable, the accuracy, completeness and conservativeness is ensured. Please include all relevant information in support of the request.*

3.2.1 | Deviation assessment (to be completed by Project developer):

The Project Developer confirms, based on the evidence presented in this Deviation Request, that accuracy, completeness, and conservativeness of claims made to Gold Standard in the form of VER products can only be prudently warranted after an elapsed time of not less than six years from the start of any STS technology projects as classified by Gold Standard.

3.2.2 | VVB opinion (to be completed by VVB, if applicable):

**Guidance* If required by SustainCERT or Gold Standard for this particular deviation, please add here the VVB's opinion.*

N/A, VVB is currently in pre planning phase to familiarize with STS technology before starting Validation Audit.……

3.3 | Impact of the deviation:

**Guidance* Use the space below to describe the impact of the deviation on project design, safeguarding principles assessment, SDG assessment, emissions reductions, monitoring frequency, data quality, potential risk or any other relevant aspect of the project. Please substantiate the impact assessment with relevant and verifiable data/information.*

3.3.1 | Impact assessment (to be completed by Project developer):

The Project Developer confirms that impact of this Deviation Request and its proposed applicability is supported by the rigorous application of peer reviewed academic research and modelling that generates greater levels of confidence that the technology and project meet and exceed the safeguarding principles requirements, UN SDG assessments and quantifications, emission reductions calculations and accuracy, and data quality supporting the project claims. As an overall result, the level of Project Risk in terms of overclaims or inaccurate assertions is significantly reduced.

3.3.2 | VVB opinion (to be completed by VVB, if applicable):

**Guidance* If required by SustainCERT or Gold Standard for this particular deviation, please add here the VVB's opinion.*

N/A, VVB is currently in pre planning phase to familiarize with STS technology before starting Validation Audit.

3.4 | Documents:

**Guidance* List of documents provided (note that once a decision has been made by Gold Standard, this deviation form along with supporting documents will be made public on the Gold Standard website. If any of the supporting documents are confidential, please indicate here to ensure they are omitted.)*

Version number	Release date	Description
5	11.04.2022	Additional information added: - date of listing, design certification, transition - standard version - specific reference to a requirement deviated from - any previous deviations/design changes approved Guidance on VVB opinion
4	14.01.2021	
3	16.07.2020	
2	03.05.2018	
1	01.07.2017	Initial adoption

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