Clean Energy Ventures Investment Application

This application should take 30 minutes to complete and every application is fully reviewed by our team. Please answer all the questions as completely as possible though brevity is appreciated. Once you submit your application we will use our best effort to provide a response on the status of your application within 3 weeks.

Company Information

Company Name*
LoopWorks

One Sentence Company Description*
Using 3 innovative strategies, LoopWorks will offer the Milpitas Metro Area an on-demand, point-to-point, all-electric Personal Rapid Transit (PRT) system that is owned and controlled locally.

Industry Subsector*
Clean transportation

Industry Subsector – Additional
Energy Efficiency: Other

What are you looking for from us?*
Mentoring
Investment

Number of Employees
1

Monthly Burn Rate
$1000

Total Revenues in the Last 12 Months
$0

Date Founded
Month -Dec
Year – 2020

Company Website
https://milpitasprt.com/

Company Location
Please note that we only invest in companies headquartered in the United States and Canada.
Country * United States
City * Milpitas
State * CA

Referral Source
Recommended by an individual or organization

Through an accelerator, incubator, or competition
Industry event
Online research
Social media
Other/Unknown
This company has applied to CEV or CEVG in the past

Contact Information
Enter the primary contact person for your company.
*First * Robert*
*Last * Means*
Contact Title Secretary*
Email Rob@MilpitasPRT.com*
Phone Number 408-262-8975*
LinkedIn Profile https://www.linkedin.com/in/rob-means-17081822/

Business Information
What product or service are you selling, who are you selling it to, and how do you sell it?*
Please specify:
- Your target markets and the target end user (if different from customer)
- Your business model and the unit economics
- Any channel partner(s) your will use to offer this

Personal Rapid Transit (PRT) is a transformative, high-efficiency technology with the potential to decarbonize the transportation sector while broadening access with transit service that actually attracts the public! End users (riders) will safely travel in personal e-cabs from neighborhood stations directly and without stops to their requested destination – saving time for riders, removing cars from roads, and reducing CO_2 emissions.

The target markets are metropolitan areas needing improved transit due to congestion, pollution, or legal requirements to reduce CO_2 emissions. A total addressable market (TAM) of $1T is estimated from a need for 150 PRT systems that each cost $6.6B and serve a 100-square-mile area.

Due to automation and a low-maintenance design, Operations and Maintenance (O&M) is expected to need 1% - 3% of capital costs rather than the 3% - 5% common in the transit industry. Through both reduced O&M costs and higher service levels, PRT could disrupt and transform the transit industry while dramatically reducing the sector's carbon footprint.

Obviously, partners willing to grant easements for guideway supports and stations will be needed. These may range from single property owners (ski resort, large real estate development, amusement park, airport, corporate/university campus) to cities with severe traffic congestion and/or walking/cycling barriers that require agreements with various private-property owners and governmental agencies.

What are the unique innovations of your product or service, how does your product or service compare to competitors, and what enables it to have a sustainable competitive advantage?*

PRT includes 2 fundamental innovations in public transit that lead to extraordinary service. PRT uses small, automated cabs, so it can provide 24/7 service with low O&M costs. PRT guideways are elevated and stations are off-line, so riders travel non-stop from origin to destination – arriving quicker than driving.

The fundamental difference between PRT and other mass transit systems is profitability. Just breaking even seems impossible with currently deployed mass transit technologies. The New York City Subway comes closest in the United States bringing in about three-fourths of the system's ongoing operating costs.

These are PRT's sustainable competitive advantages:

- *The first PRT technology deployed in an area enjoys a natural monopoly position.*
- *Any small initial PRT system in an area can expand/extend to serve a larger area – which increases the value of the entire network exponentially.*
- *Competition from other mass transit technologies is unlikely because PRT is very energy-efficient and low cost. On the contrary, cooperation/synergy with others is very likely making PRT more resilient in its service area (https://milpitasprt.com/technology/service-levels/#share).*
- *In the transportation industry, mobility as a service (MAAS) is a growing trend that will embrace PRT service levels.*

What are the value propositions of your product or service for your target customers?*

As noted above, target customers may range from single property owners (ski resort, large real estate development, amusement park, airport, corporate/university campus) and individual cities with severe traffic congestion and/or walking/cycling barriers, up to transit agencies serving entire metropolitan areas. Depending upon the target customer, some of the following pay-offs may not apply.

- *Transit agencies that subsidize every dollar collected in fares with an additional $3 would be able to reduce their cost/rider by adding break-even PRT to their transit mix.*
- *Unlike the spotty service provided by mass transit for limited hours each day, PRT can offer 24/7 service with cabs ready-to-go at neighborhood stations.*
- *PRT offers a higher passenger-to-capital ratio than fixed-rail mass transit systems.*
- *PRT can be deployed in places mass transit cannot due to its ease of routing and installation.*
- *New transit infrastructure causes nearby property values to go up 30% or more (according to the Federal Transit Administration (https://www.transit.dot.gov/valuecapture) thus giving property-taxing agencies added tax receipts.*

How does your product or service enable your customer to obtain more value at a lower cost than competing alternatives? If possible, describe how the unit economics support this.

*To be competitive with public transit is a low bar. For example, bus service in Milpitas costs users $2.50 per ride – and costs taxpayers an additional $16.60 to cover the other 85% of the overhead – higher than the 78% average subsidy for urban agencies in the U.S. [*https://www.transit.dot.gov/sites/fta.dot.gov/files/2022-01/2020%20National%20Transit

%20Summaries%20and%20Trends%201-1.pdf *] Thus, to be competitive with public transit simply requires that PRT not require an additional $3 or more subsidy for every dollar collected in fares. As a rule, breaking even – not requiring a subsidy at all – is not possible with currently deployed technologies. The closest in the United States is the New York City Subway, which brings in about three-fourths of the system's ongoing operating costs.*

Until LoopWorks begins operations and starts collecting real-world data, we rely upon the work of others that indicate fare box recovery from a modest-sized service area is adequate to pay for both capital costs and Operations and Maintenance (O&M) of a PRT system. For example, Intelligent Transportation Network System (ITNS) shows what is possible in the Economics section (pages 35 – 37) of the ITNS Business Plan (https://milpitasprt.com/wp-content/uploads/Business_Plan_2019.pdf). By charging a mere $1.10 fare, the company expects to break even on a PRT system with 30 miles of guideway and 60 stations serving 9 square miles. Reasonable underlying assumptions include capturing 20% of trips taken in the service area, and transporting 1.35 occupants per trip over an average distance of 1.6 miles. An offer of off-peak light-freight trips (at $2.50 per trip plus $1.00 per mile) is expected to attract half as much traffic as passenger trips. By adding fares from both sources to advertising income of $0.40/passenger-trip, annual revenue can pay for both O&M and retiring a capital debt of $390M that costs 4.5% annually to service.

Compared with the existing $2.50 fare for poor mass transit service, end users will find a $1.10 fare for a non-stop trip at 30+mph average speed costs less than owning and using a car – and quicker than driving one. For those 1 in 3 residents in any service area who cannot drive, both the cost and convenience of PRT beat out traditional transit options.

To compete with commuter rail is even easier for PRT. As shown at https://milpitasprt.com/wp-content/uploads/wide-area-PRT-coverage.pdf*, covering 25 square-miles with PRT service will require 110 miles of guideway and cost $1650M (or $1.65B) at $15M/mile. Serving 4X the area, 100 square-miles, is estimated to cost nearly $7000M ($7B). To make a comparison, consider the proposed BART underground extension (BART Burrow) that will provide 4 stations along a 6-mile corridor for $7B ($7000M). A visual of the dramatic difference is presented here:* https://milpitasprt.com/wp-content/uploads/BART-PRT-flyer.pdf .

What is the development stage of your product or service? What are the next milestones?*
You are welcome to include your technology readiness level if you know it, but more importantly, please describe the status of product development and the most important upcoming milestones.

The fundamental design is complete and detailed at
https://milpitasprt.com/wp-content/uploads/technical-specifications.pdf
The basic ITNS design that LoopWorks will employ in the Milpitas PRT project won competitions in Chicago, SeaTac, and Cincinnati. In 2003, the design materialized in the construction of a fully automatic vehicle for a budget of only $600,000 and 6 months from the initial order-to-proceed until operation. The vehicle operated on a 60-ft section of covered-steel-truss guideway at the 2003 Minnesota State Fair 12 hours per day for 12 days with no failures.

Based on that 2003 demonstration, the technology readiness level is 7. System prototype demonstration in an operational environment. The ITNS design awaits a specific project employing it, such as the Milpitas PRT project estimated to cost $6M for all pre-construction engineering and planning.

How many customers have you spoken to? Do you have evidence of customer traction? Please specify who your top customers or potential customers are and their level of commitment.* Specify level of commitment: ranging from expression of interest, to written commitments, to trial sales, market sales, or long term purchase agreements.

To succeed, the Milpitas PRT project needs funding, easements, and public support. LoopWorks expects an infusion of funding will attract support from both property owners and the public.

The primary customers for the Milpitas PRT system are the property/easement owners who agree they receive more value from an operating PRT system than the square footage required for easements. Of the few property owners approached over the years, 2 have responded with supportive statements; Marriott responded verbally, and the owner of the Flextronics property responded in writing: https://milpitasprt.com/wp-content/uploads/anchor-westcore1.pdf

In addition to the City of Milpitas, various other right-of-way property owners must be enrolled:

1. *Santa Clara County Roads and Airports Department*
2. *Santa Clara Valley Water District*
3. *Valley Transportation Authority*
4. *Great Mall owner Simon Property Group*
5. *Courtyard by Marriott Milpitas Silicon Valley*
6. *TownePlace Suites by Marriott Milpitas Silicon Valley*
7. *Westcore Properties (Flextronics)*
8. *Parc Metro HOA*

Since this project could not proceed without support from the City of Milpitas, LoopWorks has endeavored to enroll the City Council. A "no risk" Memorandum of Understanding (MOU) was delivered to the City Council in 2019 (https://milpitasprt.com/wp-content/uploads/mou-milpitas.pdf). The goal of the MOU is to focus the public sector on removing barriers while assuming little or no financial risk itself. Like many other attempts to develop a PRT system, the primary property-owning government agency is reluctant to proceed; many want to be second, but none first. Other than one Council member, Milpitas city officials have shown little interest. LoopWorks expects that indifference to become support once funding is secured.

The end users – Milpitas residents - have been very receptive. Our latest outreach effort was directed to high school students that produced these results: https://milpitasprt.com/art-contest/#winners

Returning to evidence of customer traction, note that the growing number of entrants into the PRT industry includes Swyft Cities (a Google spin-off) which has many potential partners negotiating at this time. They expect their initial system will commence operations in New Zealand in August, 2024. Here is a quick overview of their business plan: https://techcrunch.com/2022/05/19/swyft-cities-is-the-winner-of-the-techcrunch-mobility-2022-pitch-off/

What are the capabilities of your team that make you likely to succeed in scaling this business?* List active team members, whether or not they are full time, and their relevant skills and experience. List advisors and specify how they are valuable to this effort and how actively they engage. Lastly, list three words that describe what an observer who has seen your team in action would say that is notable about your performance and engagement together.

It's important to understand that LoopWorks will employ the capabilities of other companies in creating the Milpitas PRT system. The engineering and construction will be done by a company like Devcon Construction. Safety and security will be largely handled by the California Public Utilities Commission and City of Milpitas Planning Department.

While LoopWorks is focused on the success of this dual-loop system, we envision the possibility of extending it within the limits of the city. Our team and advisors have the business experience, local connections, and governance structure to ensure this community-based business operates well once service begins and full-time employees are hired.

As for scaling, others will exploit the industry potential, not LoopWorks. Successful completion of this $60M R&D project will kick-start a $1T advanced transit industry that employs replication, scaling, and network effects to rapidly wean us off carbon-based fuels and grow worldwide opportunities. Although LoopWorks can provide consulting services, others will manage the replication and scaling needed to grow this advanced transit industry into its total addressable market (TAM) of $1T.

Active Team Members

After a 20-year career in computer communications helping lay the foundation for the Internet, ***Robert Means*** *opened a business promoting electric scooters and bikes in the late 90's - long before they were popular. As that market matured, Mr. Means turned his focus to creating a PRT system for the Metro Area of Milpitas. His vision for systems that reduce energy needs, enhance life, and help society has drawn him to PRT technology and this project. As the sole full-time employee, he brings a wide range of skills and knowledge from multiple careers and political activism.*

Tiffany Vuong *is a Community Organizer who worked for affordable housing before running for Milpitas City Council in 2020 - placing 4th of 8 candidates (just behind the incumbent). As the Community representative on the LoopWorks Board, she led the effort for the PRT Station Design & Art Contest that involved over 100 high-school students and produced these results: https://milpitasprt.com/art-contest/*

Tam Overacker*, LoopWorks Treasurer, specializes in small business monthly accounting. She has provided knowledgeable bookkeeping services for over 15 years with over 35 years of accounting experience. As a life-long resident of Milpitas, she cares about the City's future – and acts from that motivation.*

Advisors

LoopWorks Advisory Board member ***J. Edward Anderson*** *PhD. P.E. is arguably the most knowledgeable and renown PRT expert in the world. Both his long career and impressive accomplishments speak to his integrity and that of his work results. (Find both his resumé and values in the ITNS Business Plan, pages 2 and 92-94, https://milpitasprt.com/wp-content/uploads/Business_Plan_2019.pdf .) In his most publicly acclaimed work, Dr. Anderson designed and supervised the construction of the fully automatic PRT vehicle for a budget of only $600,000 and 6 months from the initial order-to-proceed until operation. The vehicle operated on a 60-ft section of covered-steel-truss guideway at the 2003 Minnesota State Fair 12 hours per day for 12 days with no failures. Dr. Anderson is a principal in Intelligent Transportation Network System (ITNS), which owns the 1500-page, 3-volume product of his decades of experience designing PRT systems. Titled Contributions to the Development of Personal Rapid Transit, the multi-volume work provides the details underlying the broad concepts offered in the LoopWorks Business Plan.*

***Eugene Nishinaga**, President and CEO of Transit Control Solutions, Inc. (TCS) – the company likely to supply the control software – has been a technologist in the field of public transportation for 45 years, including 25 at SF BART. There he helped develop cutting edge transportation control technology for the BART system, and later managed BART's R&D Division. In this latter role, he discovered that PRT systems can achieve a cost-benefit that is approximately four times better than what can be achieved by more conventional means.*

Carol Klein is a 40-year resident of Milpitas whose support for the project and artistic inclinations led her to create the 4-minute introductory video for the project: https://milpitasprt.com/wp-content/uploads/project-intro-HD.mp4

Three words that describe our performance and engagement together: persistent, balanced, inspired.

Is there anything else we should know about the value proposition, impact of regulations, key risks, or otherwise?* Are there additional value propositions or environmental benefits from your product or service? Does the success of scaling your innovation depend on changes to laws or regulations? How will you mitigate any key risks to your business's success?

The primary risk is our Climate Crisis causing society to crash before we can start exponential growth of carbon-reducing technologies like PRT. While our Climate Crisis is the problem; Personal Rapid Transit (PRT) is a fresh, out-of-the-box solution that is networked and scalable. While transportation accounts for a large percentage of CO_2 emissions globally, it hits 59% here in Milpitas. Electrified PRT is a catalyst technology that can substantially reduce those emissions. Rather than electrify privately-owned cars that sit idle most of the time, PRT electrifies a high-use, community-shared transit system that offers low-cost, convenient, and quick trips within its service area.

While speculative real estate gains that accompanied the spread of electric trolleys may not be easy for PRT, the concept of building something (e.g. a movie theater) so you can make money selling something else (e.g. popcorn) may apply. LoopWorks has identified 23 alternative revenue streams that become possible once the system is operating. For example, the opportunity to run broadband fiber-optic cable within PRT guideways opens up both conduit leasing and ISP service options.

Based on many studies, PRT will spark a dramatic increase in public transit ridership. As shown in this chart (https://milpitasprt.com/technology/service-levels/#share), PRT service is expected to increase transit ridership by factors 2X to 10X. Therein lies value to the community due to far higher use of existing public transit resources.

Additional Environmental/Nature Benefits

- *PRT technology dramatically reduces other automobile-generated pollutants (toxic fossil-fuel fumes, brake lining dust, lubrication leaks, tire particles, etc.).*
- *PRT conserves physical resources because 1) fewer construction and fabrication materials are needed compared with other fixed-rail options, and 2) daily utilization of vehicles can rise from 4% for cars to 40% for PRT cabs.*
- *High-pressure, pneumatic tires rolling on smooth steel plates virtually eliminate noise.*
- *Higher-density communities are possible with PRT because fewer roads and parking spaces are needed – which also liberates land for parks, trails, and other uses.*

- *PRT requires only very small, widely-separated land plots instead of wide, continuous strips of land. Thus, the percentage of land required for PRT is about 0.02% vs. 30-70% for the automobile system. Page 37 of the LoopWorks Business Plan (https://milpitasprt.com/wp-content/uploads/business-plan.pdf) graphically shows how much space becomes available when PRT is substituted for a freeway.*

Risks to LoopWorks as a business are being mitigated with an inclusive governance system, gratis capital funding, and deep roots in the community.

Climate Impact

Clean Energy Ventures and the Clean Energy Venture Group only invest in companies with the potential to have a significant, positive impact on mitigating climate change. It is important for us to quantify your product or service's potential to reduce GHG emissions. Please complete this section to the best of your ability. See our Frequently Asked Questions for additional explanation and context on how to answer these questions.

Once your product or service is being sold at scale, for every 'unit' sold:

Please provide a value for at least one of the following two questions. You are welcome to provide both if your product or service reduces emissions in multiple ways. ~~How many kWhs of grid-generated electricity will a single unit reduce per year? Provide a value here if your product can reduce grid-generated electricity. For example, through energy efficiency or carbon-free electricity production. And please take into account second order effects.~~ **If the unit has an impact on emissions other than by reducing grid-generated electricity, how many tons of CO2 (or equivalent) will that unit abate per year?** Provide a value here if your product can reduce CO2 or other GHG emissions in addition to, or instead of, reducing kWhs. For example, by reducing transportation emissions. And please take into account second order effects.

352,000

After a single unit is deployed or sold, how many years will it provide the same level of impact for? For example, enter 0.5 if a single unit is in operation for 6 months; enter 20 if a unit will be in operation for 20 years.

50 [A 50-year lifespan for the PRT system is conservative.]

How many units per year will you sell at scale?

We need to know how many of the 'units' you provided info above that your company will cause to be deployed per year at the point of maximum adoption. The point of maximum adoption could possibly occur after your company has been acquired by a company capable of scaling your product or service globally. See the FAQ for more detail. Please answer only one of the following questions:

If you are producing and selling the entire 'unit' referenced above, how many units will be deployed each year at the point of maximum adoption?

Please enter the number of units sold that will be deployed in a single year.

25

~~OR~~

~~If you are selling a component of the 'unit' referenced above, how many additional units will your product cause to be deployed per year vs. the amount that would have been deployed without your~~

~~product? E.g. if you have a product that makes EVs easier to sell, how many more EVs will be sold due to your product than would have been sold otherwise?~~

How many years between now and the expected point of maximum adoption?
For example, If it is 2021 now and the expected year of maximum adoption is 2035, enter 14.
9

How do you define a 'unit' (for which you provided the data above) and how did you determine what the kWh and/or CO2 emissions savings are?
If your innovation changes a behavior, please describe how much CO2 was emitted before the change, how your innovation changes the behavior, and how much less CO2 is emitted with your innovation. Please feel free to include and describe multiple types of impact, second order effects, or any other important factors that determined your responses. If you are unable to provide this information, please explain why.

For this question, we use a shorthand "unit" of 100 square miles of PRT service. LoopWorks estimates a total addressable market (TAM) of $1T, or 150 units of coverage, making PRT a high-impact solution with gigaton-scale drawdown potential in a global market. The highly efficient, non-stop trips provided by PRT use about 90% less energy than cars. Using electric-motive force rather than fossil fuel combustion to move cabs allows use of increasingly common carbon-free, renewable energy.

An estimate of 352,000 tons of CO_2 emissions abated each year comes from the following. The dual-loop PRT system will serve an area of 1.4 sq-miles, which is 10% of the entire 14.2 square-miles encompassed by Milpitas city limits. Although population density is high in the PRT area, we will use 10% of the entire city to represent the area to be served. During 2019, 26,306,367 gallons of gasoline were sold in Milpitas, so roughly 2,630,636 gallons were bought and burned by service-area residents. If just 20% of their gas-powered trips switched to PRT and other alternatives, then PRT will prevent the burning of 526,126 gallons per year – or 4930 tons of CO_2 emissions each year (18.74 lbs/gallon X 526,126 gal. X ton/2000 lbs). Similar factors applied to a 100 sq-mi area – a single unit – would be 71.4 times as much, or 352,000 tons of CO_2 emissions each year.

Second Order Effects
Most trips in Milpitas currently utilize a car. Studies show that the synergy of PRT with other existing transportation options will dramatically increase transit ridership. (See https://milpitasprt.com/technology/service-levels/#share) These trips that previously would be taken with a car can be counted toward PRT's reduction in CO_2 emissions. A PRT system also opens up possibilities for moving freight, recyclable materials, and garbage – leading to further large reductions in CO_2 emissions.

PRT reduces resource consumption in a world of resource limits. Every vehicle, whether a car or a PRT cab, has embedded carbon that was required to manufacture it. Rather than electrify privately-owned cars that sit idle 95% of the time, PRT electrifies a high-use, community-shared transit system that are in frequent use throughout the day. By reducing the need for personal cars, fewer will be owned which will reduce the concomitant embedded carbon.

At Clean Energy Ventures and the Clean Energy Venture Group we are working to improve diversity, equity and inclusion in the climatetech and venture capital communities. As such, we collect diversity data on all companies that apply for funding, so that we can better track the progress of our individual diversity, equity and inclusion initiatives.
Providing this information is completely voluntary. The information is currently collected for measurement only and is not shared with application reviewers in order to avoid any unconscious biases. If, ultimately, we make an investment in your company, a more comprehensive survey will be conducted to discuss how we can mutually improve your organization's diversity, equity and inclusion.

Company Founded By
Female
LGBT+
Veteran
Person with Disability
Caucasian
Hispanic or Latinx
Black or African American
Asian
American Indian or Alaskan Native
Native Hawaiian or other Pacific Islander
Other
"Founded" means at least one of the founding members of the company identifies as one of the listed groups. Please select all that apply.

Company Led By
Female
LGBT+
Veteran
Person with Disability
Caucasian
Hispanic or Latinx
Black or African American
Asian
American Indian or Alaskan Native
Native Hawaiian or other Pacific Islander
Other
"Led" means the company's CEO identifies as one of the listed groups. Please select all that apply.

If applicable, describe how your company's product or service disproportionately benefits communities of color or low income communities.

Simply providing better service (quick, safe, low cost, reliable, and convenient) directly helps communities currently using public transit – disabled people and those with low incomes. The governance model being pioneered by LoopWorks can also empower communities long excluded from wealth-making opportunities.

Financing Information
Please describe your financing to date (founders, friends/family, grants, investment rounds).

The very limited funding required thus far has been provided by founders and community members listed at https://milpitasprt.com/governance/members/#community

Your Largest Previous Investors

Founder Robert Means

Total Capital Required between Now and Break-even or Exit*

What is the total amount of capital you will need to raise (as equity or convertible debt) between now and the point in time when your business is acquired or is self sufficient?

$60M

Capital Raise Target for Current Round*
$600K

Pre-Money Valuation or Convertible Debt Cap*
We invest in early-stage companies with valuations appropriate for their current stage of technology development and market growth potential. For reference, public data indicates the median seed stage valuation is $5.0M.

$100K

Anticipated Closing Date for Current Round

03/31/2023

What investment terms are you looking for?*
Equity
Convertible Debt
Other

Pitch Deck
Please provide a link that points directly to a downloadable document or to a publicly accessible directory that contains such a document. A link to your website or to a form where access may be requested is not sufficient. A Dropbox link to a single PowerPoint (.pptx) or .pdf file is strongly preferred.
Please paste a SHAREABLE link to your pitch deck (.pdf or .pptx) that anyone can access, even non-Dropbox/Google Drive users.*
https://milpitasprt.com/wp-content/uploads/presentation-VC-pitch-deck.pdf

* indicates that an answer is required.