

THE ROLE OF PUBLIC ART IN SOLAR COMMONS INSTITUTION-BUILDING: COMMUNITY VOICES FROM AN ESSENTIAL PARTNERSHIP AMONG ARTISTS, COMMUNITY SOLAR RESEARCHERS, AND ACTIVISTS

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Abstract

In this urgent decade when American democracy faces the challenge of decarbonizing the U.S. electric grid and assuring that the economic benefits of our energy transition are equitably shared, many solar energy researchers and activists are searching for new ways to partner with the civic sector. Instead of treating energy users as passive customers, experts understand the importance of engaging community as active decision-makers, beneficiaries, and communicators for a just energy transition. Distributed solar technology offers more democratic potential than small savings on individuals' electric bills. Energy experts working on the Solar Commons™ community solar model at the University of Minnesota are piloting demonstration projects with community partners in Arizona and Minnesota. These solar commons aggregate savings through power purchase agreements that create 25-year peer-governed revenue streams to support mutual aid and reparative justice work in neighborhoods. This article describes a Solar Commons research project in Arizona, with a conversation among the public artists who partnered with the legal research team to co-create communication and peer governance tools that will allow DIY Solar Commons to iterate throughout the US as a new institution in our civic sector. Images of the Solar Commons public art demonstrate how the artists helped expand the vision of solar energy from the iconic individual solar panel to a technology embedded in community justice and in a complex human-more-than-human environment.

Keywords: just energy transition; community solar; community economy; commons; technology-community partnerships; public art

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INTRODUCTION

In 2018 the first US Solar Commons™ was interconnected to the grid in Tucson, Arizona. It is a small pilot-sized solar array of 14.5kW placed on the rooftop of the Dunbar Pavilion Community Center in Tucson's Dunbar District (See Figure 1). Dunbar immediately began using the sun's free radiance to generate electricity for the building (See Figure 2),



Figure 1. Solar Commons panels on the roof of the Dunbar Pavilion Community Center. (Photo by K. Milun)

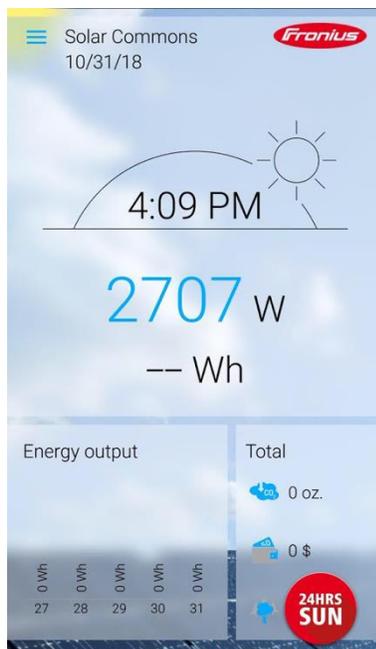


Figure 2. The first kilowatt hours showing up online at the Solar Commons inverter dashboard. (Photo by K. Milun)

and agreed to a community partnership obligation. The solar savings on its monthly electric bills would go into a community trust fund for reparative justice work in a nearby low-income community, the Garden District, home to Tucson's largest political refugee community. A local community bank, Pyramid Federal Credit Union, agreed to hold the trust funds, which amount to approximately \$3,000 a year. Every year, Pyramid will deliver the funds to the Garden District beneficiary using a community-engaged process that allows kids in the beneficiary community to help decide how to spend the Solar Commons funds in their neighborhood. For this reason, the Wright Elementary School is where the Solar Commons Project has its public art mural. (See Figure 3). The schoolyard is one of the

liveliest neighborhood meeting sites in the Garden District. Here, on a public-facing wall, the distant solar technology and the inscrutable inverter information are transformed into a story showing the sun's common wealth gathered through solar panels and shared by the community. The mural shows how regenerative guiding

principles teach us to share and care for the gifts of nature. It honors the caring community partnerships that have enabled this common good. (In the legal terms of trust law, the mural marks the community’s “equitable title” to the sun’s common wealth.)



Figure 3. Solar Commons Mural in Trust Beneficiary Neighborhood (Wright Elementary School, Tucson, AZ) Artist: Karlito Espinosa 2020. SC Beneficiaries Showcase their Deed to Equitable Title of the Sun’s Common Wealth through Public Art. (Photo by D. Kaufmann)

The art provides a visual explanation of why all these entities are partnering together in this new legal arrangement. They are realizing a new community economy tool, Solar Commons, that has the potential to capture long-term revenue streams that support mutual aid work done in low-income, often overlooked communities across the US. These partners are helping to change how society sees and values solar energy. We all know that solar panels collect the sun’s energy for at least 25 years. However, Dunbar, Pyramid Credit Union, Wright Elementary School, and the Garden District community know that, with the right legal and peer-governance tools, the solar panels can provide time and revenue that community members can use to keep more wealth circulating equitably in their local communities.

An Iterable Model: Solar Commons Institution-Building Through New Partnerships Across Neighborhood, State, Commercial, and Academic Sectors

Thanks to the pathbreaking work of the first Solar Commons in Tucson, a second, larger Solar Commons pilot is happening on the Iron Range in northern rural Minnesota. This 500kW solar array, in partnership with a local solar manufacturing firm, Heliene, Inc., would bring between \$70,000 and \$100,000 a year for 20 years to its community trust beneficiary. Following Solar Commons guiding principles of reparative justice, the beneficiary is Heliene's neighbor, the Bois Forte Ojibwe Reservation. Heliene will share its success with the Bois Forte Food Sovereignty Group, which is working to indigenize and localize their food system disrupted by colonialism, boarding schools, and the nutrient-bankrupt commodity foods of the standard American diet. Heliene business leaders and Bois Fort tribal members know that solar energy is more than a technology.

Under the desert sun of Tucson and among the pine forests of the Great North Woods, solar panels have become a way to work together on repairing the social and ecological worlds we share. The second Solar Commons will also eventually bring artists together to tell a specific story of the value of the northern sun's common wealth gifts. Joining the Tucson and Iron Range Solar Commoning communities are their two public universities: the University of Minnesota and the University of Arizona.

The Solar Commons Project is an interdisciplinary, community-engaged research project housed at the University of Minnesota (See Figure 4). In collaboration with the Solar Commons nonprofit organization, which holds a trademark on the name and model, public university partners bring together engineers, artists, and



Figure 4. The Solar Commons™ Project (SCP) is hosted by the Minnesota Design Center at the University of Minnesota. <https://solarcommonsproject.org/> (Photo by K. Milun)



Figure 5. Solar Commons information video accessible at the Solar Commons website, <https://www.solarcommons.org/> (Photo by K. Milun)

social scientists who reach across disciplinary boundaries to work beyond their institutionalized hierarchies as co-designers with communities (See Figure 5). Together they pilot and test the legal and digital platform tools that bring trust, transparency and public consciousness to communities engaged in “solar commoning”. Eventually, researchers will release robust legal

templates and peer governance platforms as free DIY Solar Commons tools for communities themselves to iterate throughout the US.

The Role of Public Art in Building Commons Institutions

Before 2018, Solar Commons researchers did not know how important it would be to have public artists as co-designing partners in our Solar Commons projects; the Solar Commons Project is, after all, a legal and economic strategy. Even without the art, researchers had successfully employed a commons vocabulary and ideas to expand the capacity of solar energy to deliver benefits to low-income communities; the Solar Commons Project was a finalist in the US Department of Energy’s national Solar In Your Community Challenge in 2019. By itself, the legal innovation creates long-term revenue streams for low-income communities through community trust ownership of solar energy infrastructure. As a purely technical innovation, the Solar Commons model can certainly make our urgent energy transition more just. However, to truly iterate across the country and to develop the full community economy potential of solar commoning, researchers realized that our community art partners were the ones bringing the most expansive shared understanding to our technical work. They were themselves the missing ingredient that would move Solar Commons from being a technical solution to becoming a commons institution.

A healthy 21st-Century civic sector needs new institutions. It needs trustworthy, visionary social forms that allow communities to become problem solvers along with the experts inventing renewable energy infrastructures and healthy local community economies. With its reparative, equitable, and ecologically regenerative guiding principles and its dependable, long-term revenue-stream, the Solar Commons model could help define what commons institutions look like in our civic sector. It envisions justice in terms of equitable access to the sun's common wealth, framing common wealth as something that belongs to everyone including future generations. It defines success as a collectively built, local common good. When the research team finishes adding the digital tools that allow community partners to govern their common wealth funds locally for community benefit, it will have contributed a new platform for civic life driven by these guiding principles. Indeed, the two Solar Commons in Arizona and Minnesota demonstrate how a commons vocabulary helps shape local civic life through civic-public and civic-private partnerships. These are indeed community scale alternatives to the dominant private-public infrastructure partnerships of neoliberal capitalism which have overshoot planetary boundaries and underserved local community economies since the Great Acceleration of industrial society in the 1950s.

In the modern era, concerned citizens have searched for a powerful common language to talk about and collectively act on the crises of climate change, biodiversity loss, and increasing social inequality. We know we need specialists in law, technology, and economics to design the technical side of our solutions to these crises. However, technicians alone cannot inspire the social and political will that results in social change. We also know we will need to build new institutions to protect and champion hard-won social-ecological solutions that more equitably distribute the benefits of energy transition. Yet, top-down expert-driven solutions may never win the trust and support of the communities they mean to serve.

Solar Commons researchers realized that the “commons” framework they used provided concepts and vocabulary to support their innovative solutions across the diverse technical terms of law, engineering, and economics. By adding artists to the local

solutions team, more accessible language and emotionally powerful images helped bridge the communication gap not only among the diverse technical experts but between experts and the communities they mean to serve. To establish commons solutions as enduring, dependable legal forms of civic life is to establish commons as trustworthy institutions. For this later step, public art becomes the ingredient that breathes life into the legal form and helps shape local economic activity. Solar Commons researchers discovered that with co-created, public-facing art, the successes advanced by the technical language of community trust ownership and community economy development were reinforced and reshaped in local neighborhood dialects where shared history and shared understanding of community need were best expressed. Making our collaborative commons work visible, responsive, and enduring through public art, we believe, is the key to transforming technical solutions into commons institutions that expand our civic sector.

A CONVERSATION WITH THE TUCSON SOLAR COMMONS PUBLIC ARTISTS

This conversation gathers the artists that joined the Solar Commons research team in Tucson in 2018. Ellen McMahon, Artistic Director of the Tucson Solar Commons Project and Professor of Art at the University of Arizona, along with Dorsey Kaufmann and Karlito Espinosa, two established local artists, lead the co-creation of interactive, community-based public art in the Solar Commons beneficiary neighborhood. They produced the Solar Commons mural at Wright Elementary School (See Figure 3) and the Solar Commons game (See Figure 6). Together, these dynamic, community co-created works of public art make the kids themselves the messengers of a just energy transition. They use play and neighborhood-inspired beauty to teach the basics of DIY solar commoning and to celebrate relationships of reciprocity with the natural world around them. In this conversation with Kathryn Milun, Founder and Director of the Solar Commons research project, we discuss our collaborative work with our community partners. Our shared goal was to make the trust-owned solar energy technology experientially known to the Tucson community members engaged in owning, peer-governing, and using its common wealth benefits.

The public art aspect of the Solar Commons research project merits its own forms of reporting and reflection, which we offer here in a conversational format. Solar Commons researchers have published more standard academic articles on the economic and legal innovations in the project (Milun, 2020; Milun et al., n.d.). The Solar Commons financial model and its scalability in the US have also been independently evaluated and reported on by the Rocky Mountain Institute, which importantly found a positive net present value to Solar Commons donors and/or financiers and a capacity for Solar Commons projects to iterate in cities and towns across the US to achieve a minimum of 10 gigawatts (Brehm & Lillis, 2018a, 2018b). In this article, our rhetorical aim is to hear more directly from the artists themselves.

The conversation makes reference to two art collaboration projects: the mural on the schoolyard wall of Wright Elementary School and the Solar Commons Game currently being tested by Tucson schoolkids. By keeping the informal tone and dialogical format of the conversation among Milun and the artists, we hope to highlight the different ways of thinking and working that took place in this transdisciplinary, community-engaged research project. Importantly, the conversational mode emphasizes the community feedback loops that the artists themselves brought to the research enterprise. In their interactive art making, the artists enabled new community voices to join our collaborative work. Karlito's process in painting the mural was responsive to conversations with community members stopping by the schoolyard over the weeks he painted, bringing him water and food and providing neighborhood stories and histories that showed up in the mural. Dorsey and Ellen likewise had an interactive neighborhood process in designing the game. Garden District schoolkids played versions of the game in afterschool programs and the neighborhood porch festival. Dorsey listened to kids negotiating and building their own neighborhood Solar Commons based on the game's experiential teachings about reciprocity among humans and the natural world. Feedback also came through kids writing their own evaluations of the game. All these community voices went into the game design. The children's voices made their way into how the legal researchers are now designing the digital governance tools that the community will use to peer-govern their equitable title Solar Commons trust funds.

Indeed, the Solar Commons game-playing will be the process by which kids, every year, learn the general principles of solar commoning so that they can take part in a ritual participatory budgeting process to determine as co-trustees how the Solar Commons trust funds are used in their neighborhood that year.

The community feedback that showed up in the finished mural and the game also inspired the “language” which the public artists co-created with the legal researchers so that the kids themselves could be the messengers of the Solar Commons common wealth ownership model. Thanks to the public artists, solar commoning could become a household, schoolroom, and neighborhood activity in which kids teach their parents and community elders how to take better care of the gifts of earth that provide for the well-being of their community. Vocabulary and concepts of common wealth, intergenerational equity, social trust, and collaborative responsibilities also take on beauty and joy through the mural and game. Researchers regularly use the language elements of the game and mural to tell the story of what Solar Commons are and how they work, whether in a public video (see Figure 5) or in grant proposals to science, technology, and society funding organizations. Thanks to the compelling artwork and the recognizable embedded community voices, Solar Commons researchers are more confident that their work will go on to build the robust institutional forms that will enable Solar Commons to iterate as a community economy tool for reparative justice in the US. Soon, we hope that Solar Commons will be a locally used tool for communities working to reclaim their commons.

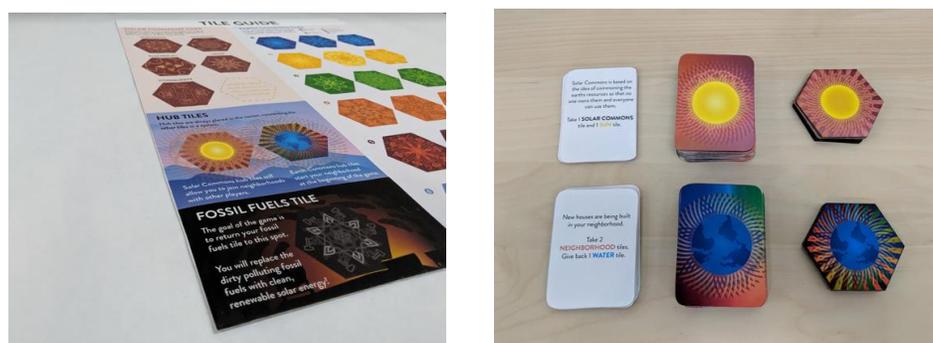


Figure 6: Solar Commons Game 2021 Artist: Dorsey Kaufmann. (Photo by D. Kaufmann)

Community Voices Through Public Art

Ellen McMahon: When Kathryn approached me about the project and wanted to get artists involved, the first thing I thought is not to do the traditional informational brochure, flyer, or poster. We wanted to avoid talking at people. Instead we wanted to see dialogue and engagement. I thought about children because they are going to inherit today's environmental problems. And children are very persuasive. They would know how to influence their parents. (That's the whole point of advertising to children, to get them to tell their mom to buy this stuff for them.) So this was the idea. We wanted the kids to have a really good time. And we wanted to do something for our public schools too. In low-income neighborhoods, schools can be bleak places... everyone's underpaid, they're understaffed, the classes are too big. I was thinking of how we could come into these environments and bring energy and creativity and enthusiasm and just give the teacher a break. I thought of how my students and I could provide a benefit, a livelier thing for the kids to do. So that's where the idea for the game came from.

Dorsey was a student in the Environmental Art and Design class I was teaching. We started thinking of how to work with the Garden District's after-school program at the Tucson Urban League. We prototyped a lot of different ideas. Dorsey was also teaching an infographics class, so we started working with a certain kind of imagery. We were thinking about a kind of communication that works through play. A dialogue, not a one-way pronouncement from some disembodied voice telling you what you should do. We thought about engaging with the neighborhood through their home life. The original idea was that the kids would take the games home and actually play them with their friends and family. This would develop the dynamic, interactive, educational, dialogical aspects of commoning. When we brought Karlito into the project, we started to develop the institutional ideas: How might a mural show commons as an enduring institution that could be iterated in other sites. How might it show the sharing of common wealth through time and the ways common wealth is embedded in this place here and now? That was one of the main tasks Karlito took on. We knew that the goal was for Solar Commons eventually to be built in other communities, in other places. What Karlito

brought forth in this mural was the idea that commoning traditions emerge in relation to their specific places on earth based on the gifts of nature at that place.

Kathryn Milun: I remember how Ellen’s suggestion that we work with play and gaming and dialogue completely blew my mind at the time. When I first came to her, I had my mind all wrapped up in the formal legal stuff. My vision for the art was quite narrow: How do we make the legal relationships of community trust solar ownership visible. And then Ellen started talking about playing games. I was reminded that before the modern era and the technicalities of modern bureaucratic states, law was less formal - more engaged and responsive through cultural forms and less shaped by experts. I knew this as a legal anthropologist, but I was so immersed in the very modern research project of creating this new community trust ownership model that could tap into 21st-Century technologies of photovoltaic solar panels. I had become somewhat lost in those difficult technical and legal issues of interconnection to a private-property, publicly regulated electricity grid. As director of the Solar Commons Research Project, I was spending so much time in the economics of solar energy and the calculations that go into extracting some of that solar value and shifting it into a revenue stream for low-income communities. But I immediately saw where Ellen was going with the idea of commoning as opposed to commons. I understood from the history of the term commons that commons are not things. Commons are better understood as active relationships and local rules for sharing. That is one reason it was so exciting to work with artists. They understood that a neighborhood Solar Commons would not treat the sun’s radiance as a thing, as a “resource.” In fact, the term “resource” comes from the modern era where a state bureaucracy is managing water, minerals, and forests, and a private business entity is leasing or otherwise using that “natural resource.” But the term commons comes from a historically deeper tradition, from times and places where water, wildlife, and forests were necessities - they were “sources of life” that had to be shared by a village or local community following their local values and rules and concerns for their children and grandchildren. The technical economic and legal solutions I was working on had to be “translated” into interactive, dynamic, place-based cultural forms if this Solar Commons ownership model were ever going to iterate as a do-it-yourself

community economy solution for the neighborhoods where it was needed. The game and the mural translate and visualize the technical solutions as deeply cultural, localized, place-based activity and values.

Karlito Espinosa: Another thing about going through play was that, as I was composing and painting the Solar Commons mural at the Wright Elementary School (See Figure 3), the school was in the process of rebuilding its schoolyard playground. The playground is not only the school playground but is a hybrid public park for the surrounding community, so it is also a community meeting area, a gathering area, just as the Solar Commons game becomes a gathering activity. It's also interesting that I



Figure 7: Corn image on the mural wall. Artist: K. Espinosa. (Photo by D. Kaufmann)

was painting the mural in 2020 during the pandemic when everyone was under quarantine. The mural was an intriguing new thing on the block and people were coming out to the playground eager to talk and tell me stories about the neighborhood. I remember when I met one of the neighborhood's community organizers; she brought her grandson or nephew to the playground. I kept thinking about how to incorporate play into the mural. I created the corn as a place where kids could go up to it and stand there for a picture (See Figure 7). This mural is much more interactive than other murals I've done, not only because it's a playground, but the wall itself is much closer to the ground. Other walls I've

worked on are far off the ground or far away from a neighborhood center. This mural was set in a space of gathering and play, a feature that made its way into the mural. The point of the art and the game and really all of the visual aspects of translating the Solar Commons model is to have people relate to it in a new way.

Dorsey Kaufmann: Our focus on play was intentional. We wanted to take important aspects of commons back from the technical and legal jargon of community trust ownership where Kathryn had secured its function in our modern era. We know there are so many technical and legal nuances that are important to actually make a Solar Commons feasible and make it operate for a community. But commons can take on a whole new life when people feel connected to its inherent notions of gathering and sharing and common wealth. Children already have an innate embodied experience and practice of gathering and sharing...they understand it and practice it. Basically the art provided a conduit for people to understand how things they already do are related to this larger and more abstract vocabulary of commons, commoning and common wealth (See Figure 8).



Figure 8: Garden District school kids playing a beta version of the Solar Commons Game, 2020. (Photo by D. Kaufmann)

Once we started working on the game for ten-year-olds, we saw that it could actually play a larger role in visualizing and realizing the Solar Commons' community ownership and peer governance model. We could produce several sets of the game and have them held in the elementary school library. Every year, when it was time for the community trust to deliver the Solar Commons trust funds to the beneficiary in the Garden District, the kids could have a day of game-playing to learn from the game about nature commoning—the mutualism of nature, and solar commoning—the mutual aid work supported by Solar Commons in their community. The kids would already know many of the game's ideas and images from the mural on their schoolyard wall. Daily playground fun in the shadow of the mural would be holding the game's lessons about a just energy transition. We would have a curriculum for the teachers and a post-game event of participatory budgeting where the kids would decide by vote where the funds would go

that year. The Garden District kids are part of the Solar Commons trust beneficiary community, but the educational game and participatory budgeting activities would realize one of the innovations of the Solar Commons model: to change trust beneficiaries from being passive recipients of funds to being active decision-makers in where the funds were going. Kathryn was building this into the legal design, and we could visualize and realize this in the game and mural.

I think that the game, the video, and the Solar Commons mural all worked to help people see that commoning is about something you are already doing. When we refer to Solar Commons as an ownership model, it's hard to understand. Most people living their lives are not thinking in terms of legal models. But the game and the mural allow people to own the ownership model; they can own the idea of that ownership model through story and play. Particularly the game, but also just playing in the playground and having the mural there. Ellen, remember how the Garden District neighborhood club members told you how long they had wanted the beauty of a mural to draw attention to what was good and beautiful about their neighborhood? The way this turned out, the neighborhood really owns the idea of the community ownership model in this mural and these gaming activities. Kathryn conceived and realized the technical aspects of community trust ownership. But the community aspect of ownership needs to embody time invested in the neighborhood and the ability to connect with neighbors and place. This is what the mural imagery and the game do. (See Figure 9).



Figure 9: Schoolyard wall at Wright Elementary School before and after mural in 2020. (Photo by D. Kaufmann)

Eileen McMahon: What we are talking about here is related to the unfortunate division between thinking and feeling which is the legacy of the Enlightenment Era. That is what art brings back together. The game keeps thinking and feeling connected through humor in the detailed scenarios. You draw a card, and it says “You took a long shower today.



Figure 10: Solar Commons Game cards 2021 Artist: Dorsey Kaufmann. (Photo by D. Kaufmann)

Give back two water tiles.” (See Figure 10). Kids get that immediately. Dorsey, you made the game funny, personal, and engaging. People's emotions were involved, they were engaged in those scenarios. And you did this for both the nature commoning cards and the solar commoning cards. In Karlito's mural work there was also emotional engagement. I remember coming to pick Karlito up at the playground after a day of painting in that 114^o Tucson summer. Remember how you would

tell me about what was happening at the schoolyard that day? You would tell me about the neighbors bringing you lunch and water and snacks. When I would

arrive, I would see you up on the lift looking out above the school roof at the mountains to the north of Tucson and then painting them right there on the wall. I remember thinking that you were gifting the neighborhood their beautiful scenic surroundings. Neighbors saw the beauty and the care that went into that mural and they saw you showing up day after day. They observed your way of working, how you made changes and added new ideas right there as you painted. It created a kind of excitement and suspense about what was going to happen next. I think that really engaged the community. You were painting a kind of cosmology, almost shamanistic, in that you were there to bring their story of place to the wall. For a neighborhood that regularly feels forgotten and pushed aside, this made a tremendous difference. Remember how some of the neighbors said, “You know a lot of people come into this neighborhood all the time and they say they're going to do this, they say they're going to do that, and then they disappear, they just write a paper and we never see them again.” For them to see the individual labor that Karlito put into their mural under those extreme circumstances was a different kind of engagement. We will build on and add to the

social trust you built by painting the mural for this neighborhood as we finish our work over the coming year. We'll be linking the game to an annual school event where the kids participate in deciding how the Solar Commons community trust funds are spent in their neighborhood.

Karlito Espinosa: Sometimes when I'm painting a mural in a site, the work can open up and become collaborative with the people at the site. Most often someone hires me to paint a mural with explicitly laid out directives. I arrive and I complete the task. But sometimes a painting commission arrives with more general directives. In those cases, there is the possibility of a different kind of engagement with the place. A gray area opens up in the project directives and the painting process becomes more responsive to what is happening in the place. The Garden District mural had that openness to being informed in an ongoing way by the people and activities happening at the site. Certainly the neighborhood visitors knew that I was working in grueling heat. Sometimes they would come back to the schoolyard at the end of the day just to bring me some water. Then they would hang around and tell me their stories of the place. I could see how excited the community was to see things from their stories show up on the wall the next day. While I was painting I would get emails consistently from neighbors who were stopping by. Even now, months after the painting was completed, the leader of the Garden District community club still texts me. It's really nice, more like friendships than work relationships. But in the end, the neighbors were clearly coming to hang around as I painted because it was their park and their public place in their neighborhood, and they knew it was theirs. As I painted I increasingly felt that the neighbors were becoming owners of the mural. They were making this public art their own.

Ellen McMahon: Everything about our engagement with the Garden District neighborhood was a true grassroots phenomenon. We didn't go through an official approval process. We just got a quick "Yes!" from the school principal, and then all of a sudden the mural was going up. We had other ideas of things we could do in that neighborhood. We were going to paint colorful images from the game tiles on the ugly

electrical boxes that dot the neighborhood streets. But we ran into a wall of government obstacles with that idea. When it came to the schoolyard mural, however, the whole project came to life suddenly with so many little acts of everyday engagement. Remember that great incident, Karlito, where somebody brought you an ear of corn for lunch while you were painting the corn? The neighborhood seemed to be saying, “We’re in this with you. It’s our project too. We’re doing it together.”

Kathryn Milun: Dorsey, I remember you telling me great stories from when you were playing the game with kids in the school. There were stories that ended up shaping the game.

Dorsey Kaufmann: There’s one discovery the kids led me to that really stands out. We had designed the game so that the kids could lay down their tiles to create “freestyle” neighborhoods with all kinds of tiles (See Figure 8). They could also create an “Earth Commons” by putting the nature tiles of Sun, Water, Air, Plants, Animals, and Minerals around an Earth Hub, and a “Solar Commons” by putting the tiles of Agreement, Gathering, Electricity, Trust, and Community around a Solar Hub (See Figure 11).



Figure 11: Making an “Earth Commons” and connecting sun tiles to create a “Solar Commons.” 2021. Artist: Dorsey Kaufmann. (Photo by D. Kaufmann)

What we did not design was kids connecting their tiles to other players to create shared “neighborhoods.” But as it turned out, the kids were unstoppable in doing exactly this. It seemed they naturally wanted to join their neighborhoods as they laid out their tile pieces. Even the first set of beta rules we used had them just building their own neighborhoods by themselves as a sort of parallel play, but the kids would build their own neighborhoods and then just keep building them out so they could connect with other neighbors. They wanted to work together as a team. There was no option to join with another player and work as a team to meet the goal. I remember thinking “Wow, they almost understand this better than we do.” It was a teaching moment for the kids to show us, “Oh no, this is how it should work; this is actually what you should build into the game.” We were building gameplay to be representative of the Solar Commons

ownership agreement, but as we were building the game there were many instances where the kids were showing us how to embody these concepts. They stayed true to the sharing principles of commoning. That's why I think beta testing with the kids was so important.

Kathryn Milun: Going back to what Ellen said about the negative impacts of the Enlightenment separation of knowledge into thinking and feeling, as I said, I had my head stuck in the technical aspects of implementing the Solar Commons model. There were lots of legal and solar technology problems to solve. While you artists were working on the game and painting the mural, I remember our conversations where I was asking you, "How is the art going to help us integrate these technical things that the engineers and lawyers are trying to solve?" These were issues related to a just energy transition and limits to private property. What frustrates solar policy and solar activists to no end is how energy decisions that so strongly impact communities are handed over to technical experts as if communities had no right to shape them with local values. We talked about how fossil fuel corporate ownership had scaled and grown powerful under neoliberal capitalism. We discussed how this was evident in the electricity sector with monopoly investor-owned electric utilities being the biggest obstacle now to the renewable energy transition. These investor-owned monopolies were also obstructing the equitable distribution of the common wealth of renewable energy—wind and solar. I remember almost pleading, as the legal researcher, that we not leave these facts out of our picture: "We can't leave the materiality of solar technology and the powerful stalling tactics of corporate fossil fuel ownership out of the story," I said.

Karlito Espinosa: It was a point of tension. I tried to explain to you one of the bigger realizations I have had as a public artist. When I go into any community, it is one thing to know about the circumstances of oppression and another to leave behind a story on their walls. When you're talking about oppression—whether this refers to border immigrant communities or, here in the Garden District, the industrial scale solar technologies that extract wealth from the community—how you represent that oppression in your research is one thing. But in a low-income community that sees a lot

of negative things around them, a reflection of themselves surrounded by their oppressive circumstances is not something they're necessarily wanting to see. As researchers it's easy to lay things out and be a realist. This is part of your research work. But then to live in your day-to-day world seeing a constant reminder of a negative thing, that has a whole different connotation. It takes on a whole different weight. For me, as a public artist, it's important to understand that a true and important message you want to communicate must nevertheless be sensitive to how the message is going to live in a place. How will it construct meaning? How will it impact the perception of self and self-worth and the sense of value a community holds? These are always struggles for an artist too. Sometimes an artist wants to talk about something explicitly, to make a political or social statement. But remaining sensitive to people's own sense of self and value is a priority. As public artists we might need to edit what we say, figure out how to make it not so ominous, not so big a part of what we are putting on this community-facing wall. Perhaps we make the negative force something in the past, something that is fading away rather than a key focus that keeps those negative feelings present in the neighborhood. The Garden District community leader, Meg, was right to remind me how important it was that this community is full of refugees and people who have seen and experienced their own traumas. They don't need a constant reminder of the powers that oppress them to know what the reality is. There's a way of talking about the negatives that can also be constructive and progressive while still referencing what needs to change. A lot of muralists sadly bypass the conversation about the long-lasting effects of negative imagery in the cities where they paint.

Ellen McMahon: Karlito, in your mural you address the issue of representing negative forces on community walls through scale, size, placement, composition. Factories are placed in the upper left corner and stylized to suggest the utopian promise of industrialization in the early 20th Century. The Industrial Era is in the past, a past technology that we want to represent, but we don't want to reproduce today. The mural

creates an aspirational language, something that goes beyond a description of the now, to a different relationship with technology in the future. (See Figure 12.)



Figure 12: Fossil fuel pollution and centralized energy ownership becomes a stylized 19th-Century factory. The promise of renewable energy and its distributed ownership benefits is represented by the colorful, iconic solar panels embedded in shared community gifts and work. Artist: K. Espinosa. (Photo by D. Kaufmann)

Karlito Espinosa: To go beyond what is existing.....this is what happens in the actual process of painting or in playing the game. This is where I think art—both in the mural and the game—is linked more to the process than to the deliverable.

Kathryn Milun: For those who are activists dealing with policy and a just energy transition, it's easy to become overwhelmed with the entrenched fossil fuel interests throughout our energy infrastructure. It feels like the entrenched power is everywhere. And yet, at the same time, when you look for 20th-Century energy infrastructure in our landscape, you realize that most of us are conditioned to NOT SEE it, to not be aware it is there. But it is there and its causing great harm to people and planet. And it's the very thing that needs to change. The task of making energy infrastructure visible—as it is—appears to go hand in hand with making it imaginable as it could be, as it should be in the near future. I sense a possible tension here between activists who want voters and others to understand that this stuff is here and needs to change, and community artists who are helping us see the infrastructure as it should and could be, as part of a more holistic and healthy set of values.

Dorsey Kaufman: In both in the game and the mural, solar panels are not shown as the solution. They appear as an available technology. As public artists, our intention was to show the technology as a system that people can employ and can share its benefits. The technology is shown as part of the human interaction with earth. It's embedded in the community context.

Karlito Espinosa: The Garden District community had a very interesting story to share with us as we worked on the mural. They told us about a company that had come into their neighborhood and put up a massive number of solar panels right in the backyard of their school, right where they had wanted to see a community garden. The community felt one of their communal spaces was stolen, colonized. And big solar energy panels were part of the theft. When we first started getting ready to work in the schoolyard, community members were wondering if we were related to that company. Our Solar Commons initiative was arriving with a lot of baggage in this neighborhood. It didn't appear in their landscape as a universal good. It's imperative to find out what things mean to the local community holding the public art. The big solar project they described to us was the antithesis of the Solar Commons project, but local suspicion needed to be disproven.

Dorsey Kaufman: The community was afraid we might be like that corporation, coming to sell our solar ideas and technologies. In fact our intention was to create a way for the community to get their own common wealth back. Our path as artists in the Solar Commons initiative was not to propose solutions or technological fixes or critiques of the fossil fuel infrastructures. Our work in the neighborhood was really about the people and community who live there. We wanted the focus to be on their everyday relationships to food and water. It's interesting that this neighborhood is called the Garden District. The schoolyard, which is the most publicly used area of the neighborhood, even has a little garden. It's a gathering place for neighbors even beyond the school kids. Our work there ended up tapping into these life-sustaining aspects of the place.

Karlito Espinosa: I remember one time when I was painting, Meg [the president of the neighborhood club] came by and told me a story about how she was part of the campaign to change the name of the district from "Midtown" to "Garden District." Hearing that, I felt we had a role to play here in embodying that idea. And it really caught on with the neighborhood. The gardening motif allowed us to show this community coming together, sharing a harvest, collectively reaping common benefits.

We didn't need to use more than a hint of solar panels to communicate the messages of gathering and sharing the sun's common wealth.

Dorsey Kaufman: That was true in the video and the game as well. The storytelling stayed with the people's hands coming together sharing a food or water source, gathering everything under the sun rather than just the technological gathering of the solar radiation.

Karlito Espinosa: We stayed attentive to what the neighbors were saying as they visited us during the process of painting, especially the kids. Sometimes you start out a mural thinking you know what you want to say, and then in the process you learn something more by listening and learning from how people interact with it.

Milun: I was so delighted when I saw how you resolved the technology representation issue Karlito. Those beautiful, colorful icons recognizable as solar panels emerging from the left. They angle towards and appear to gather the sunlight which itself turns into a token of common wealth passed on from an elder to a child's hands. You took the Solar Commons tile from the game and made it come alive in another way on the mural. (See Figure 13). And all of this stems from Ellen's original idea: Let's make the kids the messengers for the Solar Commons.



Figure 13: Representing intergenerational common wealth through community trust-owned solar energy. Artist: K. Espinosa. (Photo by D. Kaufmann)

Ellen McMahon: The purpose of art is to turn our assumptions upside down. We assume that grownups always know more than kids or even better than kids. But art can play a role to show us otherwise. It's a technique called "defamiliarization." Making the familiar seem strange. It creates a little opening in your brain so you can see something differently.

When it comes to the climate crisis and energy transition, it makes so much sense to have the children take up the message. They are the generation most affected by what is happening right now. So much advertising and public relations around the climate-energy nexus is geared to adults, as if children would only be receptive to messages about toys. But if we see that art is meant to surprise us into thinking differently, then we realize that kids are the ones most receptive to this kind of surprise. It's the same situation with humor. Humor also engages your defenses. When you're laughing, you have a sudden, more open mind. Art is magical in that way too. It's making you see things differently by breaking through boundaries that are suddenly not useful. It reminds me of an incident when we were playing the Solar Commons game with the kids in the school. One girl got a game card that said, "You left the lights on; give back two electricity tiles." And her teammate said to her, "Why did you leave the lights on?" There was no boundary between the story in the game and the kids themselves.

So that's one thing I think we can learn from children. They know how to move easily between being rational thinkers and playfully engaged teammates. And that's the whole idea of play and why it is at the heart of art. Play allows us to undo some of those assumptions, those boundaries and silos---those things that make us more and more dull as we get older, more and more resistant to seeing through new eyes.

Dorsey Kaufman: I think you're right. There can be an openness to fresh perspectives when you're surrounded by lots of new input. The scenarios we put on the cards were only one kind of stimulus to thinking and playing the game. The imagery on the tiles was also suggesting connections in other ways. The tiles were designed to be their own kind of system. The game begins with all the tiles stacked on a "Common Wealth Tile Guide" that functions like the antithesis of the banker's station in the Monopoly game where the monetary wealth of mortgage cards and cash are stored. Common wealth is

made up of nature tiles and the cooperative function tiles (Agreement, Gathering, Electricity, Trust, and Community) that create a Solar Commons. There are also fossil fuel tiles that have to be taken out of circulation for the game to end. (See Figure 14). When kids start arranging the tiles next to each other, they can imaginatively explore



Figure 14: Common Wealth Tile Guide for the Solar Commons Game. Artist: Dorsey Kaufmann (Photo by D. Kaufmann)

a lot about the relational nature of humans to nonhumans and to technology. The card scenarios, on the other hand, were designed to guide players to think intergenerationally and to consider the deep complexities in environmental scenarios. For example, I remember kids debating a scenario where a mining project comes to your neighborhood, and you have to give back some water tiles. So, the environmental degradation is noted at the same time that you gain some minerals. We created lots of scenarios that provoked

discussion because they presented complexities: How do we measure the value of two water tiles against a mineral tile? There are no quantifiable point elements in the game. There is give and take. There is reciprocity. Gifts also appear. The kids really take these relationships and complexities seriously within the magical realm of play. In the mineral and water tile scenario, you could see the kids questioning whether it was okay to trade water for minerals, to gain something here but at the same time lose something over there. It was fascinating to watch them play and see them struggle over their decisions, like a cost-benefit-analysis. The artfulness of the game gave them that playful openness to reflect on the values informing their decisions.

Karlito Espinosa: One thing I always think about with murals, and this also makes sense with the game, is to stay away from explicit messaging. With political messaging someone tells you something is right or wrong. But compare that to the Woody Guthrie song *This Land is Your Land*. It's a classic, even patriotic American song. But it has these incredible lyrics about mutual aid and living a life surrounded by things that

belong to everybody. Ultimately, the message is subliminal but, in its simplicity, it also becomes very real. Murals can do that too. You want murals to be enjoyable, you want people to discover things in them. You want people to have the space to experience fun, beauty, and whatever else inspires them without feeling it is propaganda. The art has to keep things subtle and allow for the ambiguity that invites interpretation.

Dorsey Kaufman: In the game there are also those subtleties when kids are drawing cards and making decisions about how to build out their neighborhood. It's those decisions, not just the cards, that lead to the game's lessons. There's a larger metaphor here about the importance of making your own discoveries as you go. Another thing we wanted to encourage in the game was that players were not playing for themselves. They were playing with the aim of building neighborhoods. This stokes their collective imagination. The kids could build out their own neighborhoods or they could join with someone else and play together to build a neighborhood and have more fun. It's like with Legos: they aren't as fun if you're the only person in the world that has them. But if you can go over to your friend's house and put your Legos together, you'll have more fun using your shared Lego language know-how to build things together. Along these lines, there was another thing we did in the game to create a more collective experience of fun. We explicitly decided not to have just one person win. Again, like with Legos, it's not about winning, it's about building something together.

Karlito Espinosa: So many games are created with values and rules that mirror our dominant capitalist economy. Their goal is to undermine your neighbors and become the winner by accumulating all the resources or all the money or whatever it is.

Dorsey Kaufman: The Solar Commons game was intentionally designed to work against that kind of logic. We wanted the end goal to be that everyone becomes connected, everyone is sharing resources and neighborhoods. But it was funny how responsive the kids were to what we were doing with that design. We tested the game several times in the field and revised our design based on what we were seeing the kids do. The kids

were encouraging us to create a game where they could make connections and play collectively.

Ellen McMahon: It's important to note that in making the Solar Commons game we were inspired by Ken Garland's game *Connect* from the 1960s. He was a British designer. What inspired us in his game was this idea of the pleasure that players could have building something beautiful together. There is also chance involved in Garland's game, but players can arrange something beautiful with what they are given when they work together. We loved the idea of using tiles selected randomly to build something beautiful together. We thought this was a great parallel to the idea of commoning.

Kathryn Milun: Recently I heard that some parents were asking to have special psychologists in the schools to help counsel children against the despair they were feeling learning about the climate crisis and loss of wildlife in the world. I was wondering how much of that despair was a projection of my generation onto the next, as if we were going to teach the next generation how to manage their despair over our disconnected political systems' unwillingness to act. Now I think of bringing this game into the schools and encouraging interconnected balanced play of give and take among plants, animals, minerals, water, air, and human technologies. It strikes me that the connectivity of the game mimics the kind of regenerative repair that we see in nature.

Dorsey Kaufman: I actually teach something like that in my illustration class. We study botanical illustrations and I always show how the European illustrations tend to be on blank white background with the flower being the identifying mark of the plant. I ask the students to think about what actually makes something a particular kind of thing. What makes a rose a rose is not its clipped essence standing out against a white background. A flower is actually weakened when it is isolated. It flourishes in its mutually beneficial environment. That is its essence. Those European botanical illustrations reminded me more of the European colonial project that identified and showcased the nature of other cultures by isolating their people and objects, taking them out of what made them strong and resilient, and renaming them as weakened

beings as seen from the European, isolating cosmological perspective. In the mural and in the game, it was important for us not to have an individual solar panel come to represent the essence of solar energy. We always visualized solar technology embedded in community and in a complex human-more-than-human environment. When I think of despair, that's the first thing that came up in my mind, that tendency to isolate, weaken, and then take as a core feature that which has been alienated, from what makes it strong. It's the exact opposite of nature's essential trait of regenerative repair. In the game, we make clear that you cannot build a functioning earth commons system unless every single piece—the plants, water, air, animals, minerals, sun—were connected as a whole. We built the game to educate through kids experiencing joy in working together and connecting nature systems to human systems, nature commons to the technology and community economies that make up Solar Commons.

Ellen McMahon: We are still working to strengthen how the neighborhoods connect to one another in the game. But I want to respond to something Karlito said that reminded me of a fabulous essay entitled “Enlivenment” by the evolutionary biologist Andreas Weber (2013). He finds fault with the scientific understanding that arises from the Age of Enlightenment when scientists pulled things apart to know them better. He talks about the emergence of anatomy, the study of a human being through dissecting a cadaver. Pulling it apart, isolating the parts, getting knowledge that will aid in understanding life by understanding it in death. Instead, Weber champions the new, transdisciplinary sciences that focus on nature's inherent interconnectedness, what he calls the study of “enlivenment.” While the Enlightenment created knowledge from isolated, inert parts, enlivenment sciences look at complex, interconnected wholes. It finds problems in the knowledge that represents and studies life disconnected and dead. In this light it's interesting to hear Dorsey describe teaching scientific illustration by including the history of how plants were drawn apart from their environment, identified, named, and put in an archive for later systematic access. This approach that shows the problems of disconnecting nature from its complex liveliness was also a key concern of the Romanticism movement. Weber describes how the Romantic era responded to the new Enlightenment sciences by focusing on the magic of life and the

interconnection of everything. Weber talks about “paradoxical inter being” which reminds me a lot of what Karlito is calling “the grey area” in the mural and the game, leaving room for various interpretations.

Dorsey Kaufman: The concept in the game and mural is “gifts.” It’s more than an economic idea. It’s a paradigm shift that needs to happen in Western knowledge. We need to move from the idea that nature somehow owes us something or is there for us to take. In fact nature is given as a gift. What does that mean?

Karlito Espinosa: What is given cannot be taken for granted. We aren’t owed anything. On the contrary, what was made available through nature’s gifts comes with responsibilities.

Dorsey Kaufman: As artists on this project, we have been trying to render the balancing act that I think goes to the core of the gift economy. The legal terminology Kathryn has been bringing to us—about trust law, trustees, and beneficiaries with equitable title rights. . . in many ways these turn out to be different instances and metaphors of what we are reading about in authors like Andreas Weber. It turns out that today we are looking for a new basic vocabulary that can take us beyond the disconnections of modern life. We see resonances of this vocabulary in many diverse fields including law.

Ellen McMahon: Kathryn gave us quite a task, to bring art into representing the civic concept of Equitable Title. How to represent the idea that neighbors in a community are also commoners with property rights to gifts of nature that belong to everyone, including future generations. Kathryn was asking us to use art to create a public-facing way of claiming, asserting, and celebrating the collective right of people in this low-income Tucson neighborhood to gather and use their common wealth from the sun. And she gave us an additional task: that common wealth use also needed to abide by the general rules, standards or guiding principles of the Solar Commons community trust legal model. She summarized those guiding principles with the Jewish concept of *tikkun olam*, the obligation to repair the world. I remember how we started working with the

Indigenous concept of the “Honorable Harvest” that Robin Wall Kimmerer talks about in her book *Braiding Sweetgrass* (2013). We were thinking of how an “equitable harvest” might carry those meanings forward into a non-Indigenous framework. We also thought about nature as both the giver and the gift. We recalled Honorable Harvest teachings, for example, only taking half of whatever is given.

Kathryn Milun: Many of these principles are things that the Nobel economist Elinor Ostrom had found in small scale nonmodern village economies. In her book *Governing the Commons* (1990), Ostrom summarized her decades of cross-cultural and historical research on commons with a basic vocabulary, eight general rules that you see generally in commoning cultures. Many of those rules are basic to the Honorable Harvest teachings and to gift economies that pass obligations along with a gift.

Karlito Espinosa: Working on the Solar Commons public art we talked a lot about the balancing act of accepting a gift. It’s a kind of taking where you feel certain guard rails are operating: you’re not supposed to hoard or keep taking gifts. We tried to dig into what kind of unconscious or unspoken rules of engagement might be operating in cultures attuned to gift economies. We thought a lot about how to represent intergenerational common wealth, gifts of nature that came with obligations to continue paying it forward to the next generations.

Kathryn Milun: You’re reminding me of one of the greatest delights of this collaboration for me, the incredible kinds of feedback loops among us as we were working together. For example, it turned out Ellen and I were both reading *Braiding Sweetgrass* and were referencing that vocabulary in thinking about the equitable title representation conundrum. As collaborators we all did a lot of work together trying to create a language that would reintegrate worlds pulled apart by specialist technical vocabularies of law and technology. We wanted Solar Commons, this community partnership-based, trust-owned solar energy technology, to make sense experientially to the Tucson community members engaged in the owning, governance, and common wealth benefits. We all agreed that we could only do that with public art.

I have to tell you all how this experience of working with public artists has changed my way of being a teacher and a public scholar now and into the future. As a community-engaged researcher, I now always consider public art as an option or addition to how important, useable findings can go into the public domain; as a teacher, I make sure my students see what collaborations among artists, social scientists, and scientists look like in the public domain. I even ask students to design or find an artist-collaborator to co-design public art for student research assignments. And now, the National Renewable Energy Lab has reached out to the Solar Commons Project and asked us to mentor a team of university engineering students in this year's Solar District Cup competition. Once again Ellen will lead a class of her University of Arizona students in Environmental Art and Design and I will lead a group of anthropology students from my New Commons community economy design course and together, with University of Minnesota engineering students, we will form a Solar Commons Team from our two public universities. It's so exciting for our students to be partnering in this way. They will be learning from the work we've done in Tucson! Imagine, co-designing district solar microgrids that are technologically resilient, socially reparative, and culturally embedded in visualized values of the sun's common wealth!

I think public art can make an important contribution to the equitable deployment of solar and wind energy. These renewable energy technologies are ready to be massively deployed. What is holding us back is the social and political will. People don't understand basics about the technology and its availability. And that makes them vulnerable to the scare tactics and glossy commercial messaging of the fossil fuel industry. Public art can appear differently and with more integrity in our communities.

Your ideas about making the children the messengers for Solar Commons, about carrying the meaning of Solar Commons in play and games and art making and schoolyard murals, this was a humbling adventure for me as a legal anthropologist. The community stories coming from neighbors who stopped to talk to Karlito while he planned and painted the mural, the observations and enthusiasm of the kids telling us what they liked and learned from playing the game, all this brought a deeper understanding of the

community that could not have come from surveys or other social science approaches. When I talk to my colleagues in law and solar engineering about our collaboration, their hearts melt. They would love to have a partnership like this that adds beauty, the sense of obligation and the shared value of common wealth to their work for a just energy transition.

Ellen McMahon: Well, we'll just have to carefully write up a good, clear societal impact statement that engineers can use to hire artists as part of their infrastructure budget.

Dorsey Kaufman: We all have a lot of work to do these days to show what it actually looks like to be responsible to each other and to a greater good.

Karlito Espinosa: And the art allows us all to be messengers in ways that are honest about all the contradictions that remain. We saw it in the game and the mural, neighbors young and old came out to talk about how they had come to be part of this community. They raised contradictions about the way things are and the way things could be for the better. Even at the outset, the art was moving people to talk to each other.

Kathryn Milun: With the Solar Commons revenue stream arriving in this neighborhood, when the school kids have access to the next set of community economy and peer governance tools we are building for the project, the art will be there to continue to move people to work together.

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