HeroX CEI Public Materials for Dissemination

Eighth Generation Consulting

Summary:

As part of our application, we have created and publicly disseminated educational resources and templates to ensure that we are able to expand the impact that our project has and allow other communities, businesses, and individuals to learn, grow, and implement solutions similar to ours.

This material is published and hosted on websites operated by our team as well as published and highlighted through our team lead Saxon Metzger's LinkedIn, where he serves as a top voice in renewable energy. Outreach through Metzger's LinkedIn profile has significantly extended the reach of our educational mission, achieving in the last 6 months over 103,500 impressions and 1,200 engagements. Metzger's 9,171 followers and over 24,000 messages from LinkedIn members provide a strong network for engagement and knowledge sharing, underscoring the project's relevance and impact. These interactions have been invaluable in refining our curriculum to meet community needs and foster meaningful engagement.

We have created a template for site walks on Eighth Generation Consulting's website as well as made Lumigrid's site documentation functionality available publicly online, allowing us to replicate the positive influence that we've had in estimating and initial community engagement related to specific renewable project work allowing others to replicate our approach.

Our team has also developed and published educational and workforce development material led by Metzger, a graduate instructor and course developer in sustainable business and economics at Wilmington University with experience developing curriculum for EPRI, as well as team lead for this project at Eighth Generation Consulting. In collaboration with Ayda Donne, an NYU Macracken Fellow and Adjunct Instructor at NYU, and Wes Ladd, adjunct faculty in cybersecurity at LSU, these presentations convey insights from our work with the Osage Nation and other communities.

These materials are intended to guide others pursuing community-focused or Indigenous-led renewable energy, manufacturing, and entrepreneurship focused initiatives. All 6 presentations below are available in PDF and Powerpoint format, with the first recorded and available in video format as well. All of these will remain accessible on our website and have been widely shared on LinkedIn, along with being attached here in PDF format:

Indigenous Communities and Decommissioning - Understanding the End of the Renewables Lifecycle for Community Optimization

Critical Lessons for Future Installers to Reduce End-Of-Life Costs

Entrepreneurship as Environmental Justice - How to Transform Inclusive Site Selection into an Economic Powerhouse

It's Decommissioned, Now What? Solutions for Removed Solar PV Material

Protecting our Future - Tools for Sustainable Businesses to Support Equitable Workforce Development

Solar End of Life Options - Comparing Solar Decommissioning and Repowering

Publicly Available Locations:

Presentations:

https://www.8thgenconsulting.com/educational-resources

https://vimeo.com/1029874459?share=copy

Site Documentation Support:

https://www.lumigrid.io/resources/site-inspection-report

Printable Site Walk Template (Bottom of the Page):

https://www.8thgenconsulting.com/educational-resources

Template Site Walk Checklist

Type of Work Site Inspection

Address

Checklist

Site Entrance and Surroundings

Site Entrance

Focus: Condition of the main entrance, nearby signage, and road access for heavy equipment. Ensure visibility of any space constraints around the entrance.

- ☐ **Photos Needed:** 3-5 images

Access Path to Array

Focus: Pathways from entrance to the array. Document any obstacles (e.g., narrow paths, rough terrain, or vegetation) that could impact the transport of equipment.

- ☐ **Photos Needed:** 5-8 images

Security and Perimeter Conditions

Focus: Condition of fencing, gates, and surrounding areas for security measures. Check for visible gaps, signs of deterioration, or nearby access points.

- ☐ **Photos Needed:** 4-6 images

Array and Structural Conditions

Racking and Mounting System

Focus: Racking structure, especially joints and fastenings, looking for any loose or rusty components. Take wide shots to show spacing between rows and close-ups on structural connections.

- ☐ **Photos Needed:** 8-10 images

Ground Integrity and Drainage

Focus: Ground conditions around and under the array, focusing on erosion, pooling water, and natural drainage paths. Check for compacted soil, water runoff paths, or signs of soil erosion that could affect the foundation stability.

- ☐ **Photos Needed:** 6-8 images

Electrical Components & Wiring

Panel Conditions and Manufacturing Details

Focus: Panel labels (model, serial number, manufacturer), general condition, signs of wear or overheating. Include any nameplates or specifications visible on the units.

- ☐ **Photos Needed:** 10 close-up and 5 far off photos spread throughout the site of front, sides, back, and rows of the panels on site.

Inverter Condition and Manufacturing Details

Focus: Inverter labels (model, serial number, manufacturer), general condition, signs of wear or overheating. Include any nameplates or specifications visible on the units.

- ☐ **Photos Needed:** 3-5 close-up images per inverter

Wiring and Conduit

Focus: Document conduit runs, especially along pathways and connection points to inverters. Check for any visible wear, damage, or areas where conduit is exposed to potential impact.

- ☐ **Photos Needed:** 6-10 images

Disconnect and Grounding

Focus: Disconnect switch locations and grounding points, looking for signs of corrosion, damaged insulation, or loose connections. Capture any relevant labeling or signs of code compliance.

- ☐ **Photos Needed:** 4-6 images

Environmental and Site Safety Considerations

Potential Hazards

Focus: Surrounding vegetation, signs of animal nesting or burrowing, and any shading from nearby trees or buildings. Look out for potential obstructions or hazards around the array.

- ☐ **Photos Needed:** 5-8 images

Drainage and Flood Risks

Focus: Areas with visible erosion or pooling, drainage paths around the site, and any low-lying areas prone to flooding. Include images showing overall site topography to highlight water flow patterns.

- ☐ **Photos Needed:** 5-8 images

Project Readiness Factors

Equipment Storage & Staging Area

Focus: Clear areas near the array that could be used for staging and storing equipment. Document potential obstacles that could restrict space or movement.

- [ ] **Photos Needed:** 3-5 images

Temporary Facilities

Focus: Potential locations for placing temporary facilities (e.g., porta-jons, dumpsters). Ensure these areas are accessible yet not obstructing equipment access.

- [ ] **Photos Needed:** 2-3 images

Critical Lessons for Future Installers to Reduce End-Of-Life Costs

Saxon Metzger

Do This, Not That!

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- Goals
  - Identify the issues that we're facing from our current market and how it's developed.
  - Demonstrate the importance of early planning and decision-making to reduce future costs.
  - Clarify the key strategies and practices for installers, financiers, product manufacturing firms, and crew looking to improve project performance.

- We need an industry wide incorporation of decommissioning
  - How we're selling and developing new solar
  - How we're investing in solar infrastructure
  - How we're committing to various products and tech

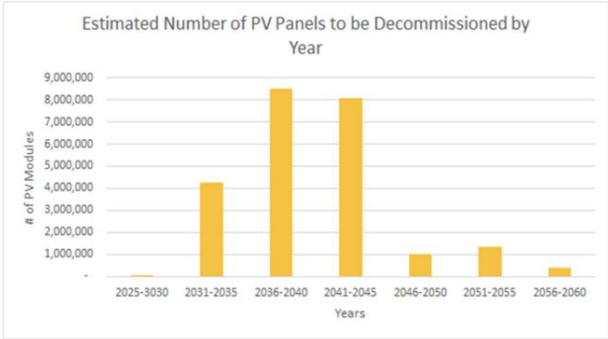

Figure 5-2. Estimated Number of PV Panels Decommissioned by Year

Here's the Reality:

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- Solar decommissioning will be discussed at the 10-15 year mark
- Everyone thinks their solar is a gold mine
- Everyone thinks they can easily perform and estimate decom work
- I don't see many solar installers discussing the details of decom. It's a losing sales conversation, but there's a reality
- I've lost numerous bids to theoretical pricing. You have to understand the market to beat quotes that aren't real
- Rooftop systems will need to be removed and replaced eventually
    - For roof repairs or new roofing
    - Begs the question, swap while it's already off the roof?

Understanding End-Of-Life Costs

- Decommissioning steps and estimates is more than just installation in reverse.
  - Take New York's example of a 2 mW site.
  - At 200-400w per panel, that's 5,000-10,000 panels
  - Approximately 1-10 acres per site

- These costs are delusionally inaccurate and highly optimistic. You'll go broke with this
  - This assumes a break even on all components. After 20 years, that's not reality
    - Recycling: $18 per panel
    - Ballast at $80/ton concrete
    - Pallets for transportation and removal
  - Trucks to recycling center: Only 500-800 panels per 53' flat bed
  - Seed Disturbed Areas…. $250?
  - Panel removal at 50 cents per panel for labor?

New York state offers a more detailed set of requirements.

According to New York state's decommissioning guideline handbook, a 2 MWdc solar facility might cost $98,900 to dismantle. Facilities on third-party-owned land must include a guarantee or security agreement.

Table 1: Sample list of decommissioning tasks and estimated costs

Tasks	Estimated Cost ($)
Remove Rack Wiring	$2,459
Remove Panels	$2,450
Dismantle Racks	$12,350
Remove Electrical Equipment	$1,850
Breakup and Remove Concrete Pads or Ballasts	$1,500
Remove Racks	$7,800
Remove Cable	$6,500
Remove Ground Screws and Power Poles	$13,850
Remove Fence	$4,950
Grading	$4,000
Seed Disturbed Areas	$250
Truck to Recycling Center	$2,250
Current Total	**$60,200**
Total After 20 Years (2.5% inflation rate)	**$98,900**

I'm Not Done

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- Other Cost Issues
  - Far more labor, equipment etc.
    - Concrete
      - A skid and breaker costs more than $1,500 for concrete
    - Removing electrical equipment
      - Electrician?
    - Dismantling racks
    - Remove rack wiring
    - Removing cable
    - Removing Ground Screws and Power Poles
    - Remove Fencing
    - Grading
- These numbers create downward pressure
  - Don't go broke competing against these prices

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The Impact of This

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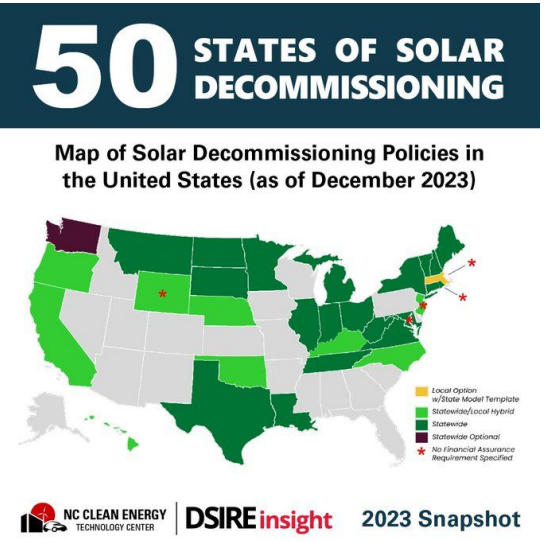
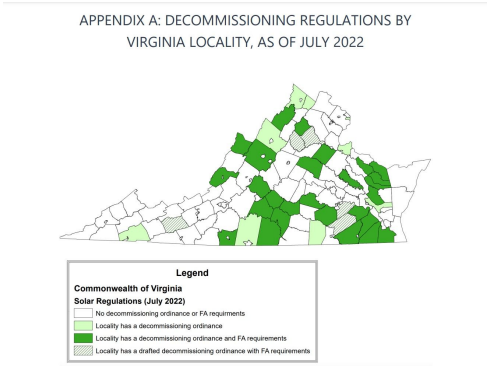
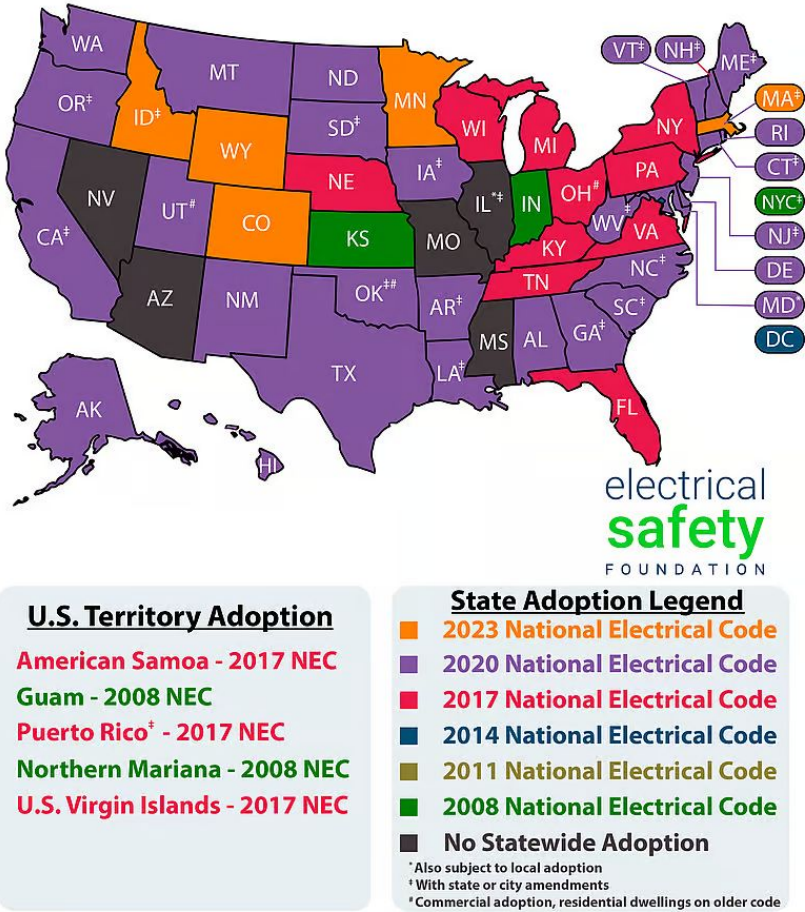
- Horrible press for our industry
  - We just became mainstream!
  - Can we survive breaking our promises?
- Unethical for us to abandon the legacy assets that built our solar future.
  - This is the same thing that orphaned oil wells have done
- Legal and financial costs
  - Did our workers tell clients wrong information?
  - Will the government step in to solve acres of abandoned solar fields?

Current Challenges: Regulations

- There's local, state, federal, and international rules!
- Research is a huge cost
- Permits: Anecdote







Best Practices in Design and Installation: Panels

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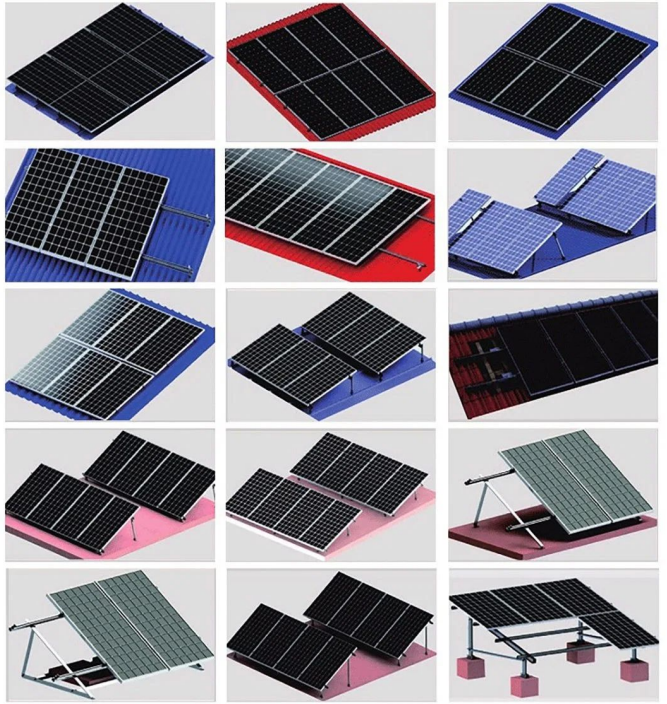
- Design and Engineering
  - Voltage
  - Sizing
  - Connector type
  - High quality
  - High wattage
  - Selection of materials for ease of recycling or reuse.
  - Incorporating modularity to extend the lifecycle.

- Installation
  - Waterproof seals
  - Correct connectors, proper wiring
  - Be gentle up front
  - Create a decommissioning plan before you install. Encountered an issue or cost? Good!
  - Create solutions while you install for the problems that would be faced at the end.

Best Practices in Design and Installation: Racking

- Designing with disassembly in mind.
  - Warranties?
- Selection of materials for ease of recycling or reuse.
  - This will help your project economics at decommissioning
- Incorporating modularity to extend the lifecycle
  - Can you replace sections?
  - Rewire easily?



Best Practices in Design and Installation: Ballast/Attachments

- Attachment points = roofer cost, less waste
- Ballast = Labor, equipment, and recycling
- Self-ballasting options
- Selection of material for longevity, reuse, and ability to be added and removed regularly

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Best Practices in Design and Installation: EBOS

- Aim to minimize risk of structural repairs needed
- Accessible location?
- Properly installed to keep equipment at peak operation?
- How efficient is your EBOS setup?

Do's of Installation to Reduce End-Of-Life Costs

- Prioritize accessibility for maintenance and repair.
- Use standardized parts to facilitate efficient repowering.
- Implement traceability and documentation of materials for future recovery.
    - Personal Anecdote: As-Builts

Don'ts of Installation to Avoid High End-Of-Life Costs

- Avoiding non-recyclable materials and composites.
    - That includes materials that are challenging to remove
        - Gravel
        - Concrete
- Utilizing products that are difficult to disassemble.
- Ignoring the potential for future technology upgrades.

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Solutions: Incentives for Reducing End-Of-Life Costs

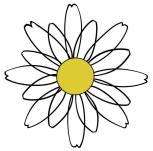
- Tax incentives and rebates for sustainable practices
- Owning the costs of decommissioning or recycling up front
- Ongoing work on decommissioning to help create value while offering the service
- Enhancing brand value and customer loyalty through sustainability

Technology and Innovation in Product Life Extension

- Advances in materials science for longer-lasting products.
  - Doesn’t resolve roofing issues
  - Doesn’t resolve structural or ground issues like erosion
- Better O&M solutions
- Improved Repowering Options
- More Modular Solutions

Engaging Stakeholders in the Lifecycle Approach

- Role of consumers in driving demand for sustainable products.
- Partnering with recyclers and waste management firms.
- Collaborating with regulatory bodies for effective standards.



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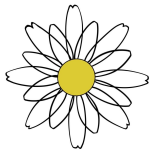
Future Trends and Predictions in End-Of-Life Management

- Better and better recycling, upcycling, reuse, and reduction strategies
  - Cheaper
  - More efficient and sustainable

- More established-industry benefits
  - Affordability
  - Ease of navigation
  - Options
  - Manufacturer improvements



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Strategies for Installers

- Develop a full life cycle perspective for new installations
  - What is our plan to build, fix, and remove this?
- Training and educate teams on installation and design best practices.
- Building a network of partners for material recovery and recycling.
- Begin working on these projects.
- Find ways to market yourself based on these services.

Challenges and Barriers to Change

- Too few options
  - Inexperienced contractors
  - Locality dependent
  - Material recycling/upcycling solutions haven’t all scaled

- Resistance within our industry
  - Who profits from these costs?
  - Who loses from these costs?

- The importance of leadership and culture change in adopting new practices.

Conclusion

- Important takeaways:
  - Early planning
  - Best practices
  - Engaging with stakeholders often
- Future outlook:
  - Role of innovation
  - Regulatory compliance.
- Call to Action: Are we creating positive or negative headwinds for our industry?

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Thoughts? Questions?

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Solar End of Life Options: Decommissioning vs. Repowering

Saxon Metzger

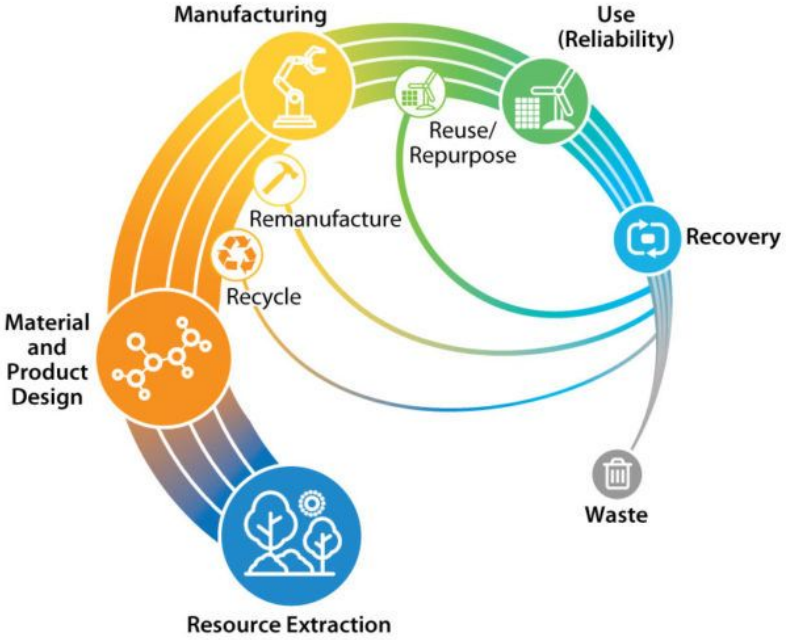
Presentation Summary

Will address three main topics:

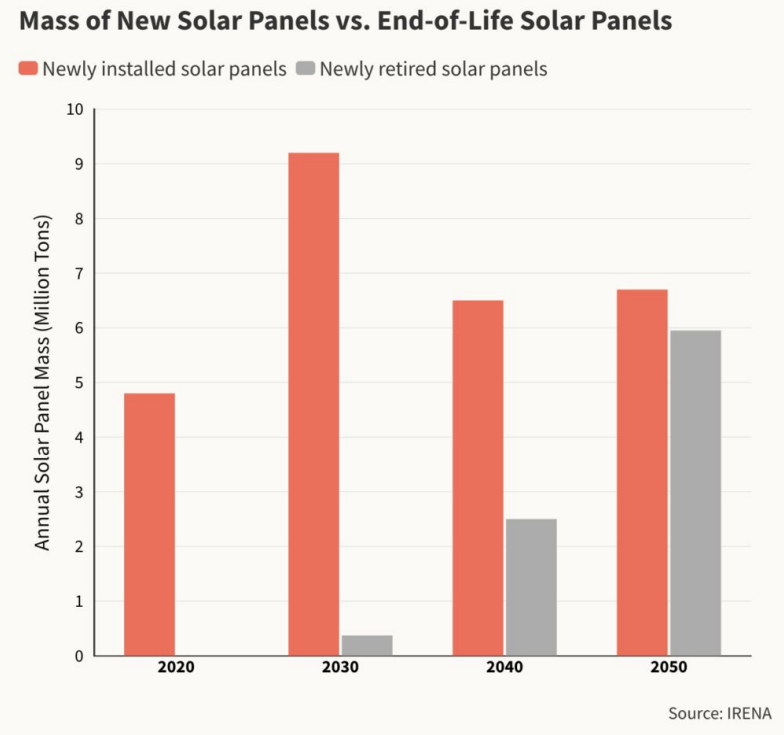
- Why is solar end of life an issue that should be addressed?
- What is the difference between decommissioning and repowering, and what are the costs/benefits of each?
- What are some of the unique nuances and changes coming to this discussion domestically and internationally?

A Brief Introduction to Solar End-Of-Life/Circularity

What is decommissioning?



Why Care?
It's a Big Issue, and Big Business



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Decommissioning vs. Repowering: An Overview

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Decommissioning: To return a particular project location to its original condition prior to the installation of a solar project

- Completely removing all panels, racking, EBOS, etc from the site
- Typically requires roofing/structural work on roof top systems and grass reseeding and potentially regrading for ground mounts.

Repowering: Taking an existing solar site and replacing failing or failed components to extend the overall lifespan of the project

- Replacing central inverters with string inverters
- Replacing panels with better, higher wattage panels
- Replacing damaged RSS, MC3 or 4 connectors, or other EBOS

Determining Repowering Viability

1. Review client or bid expectations. Is it even an option?
2. Assessing panel and other material condition and age
3. Determine the interoperability of the site with other technologies
4. Receive quotes to ensure the work can be performed
5. Perform a cost-benefit analysis

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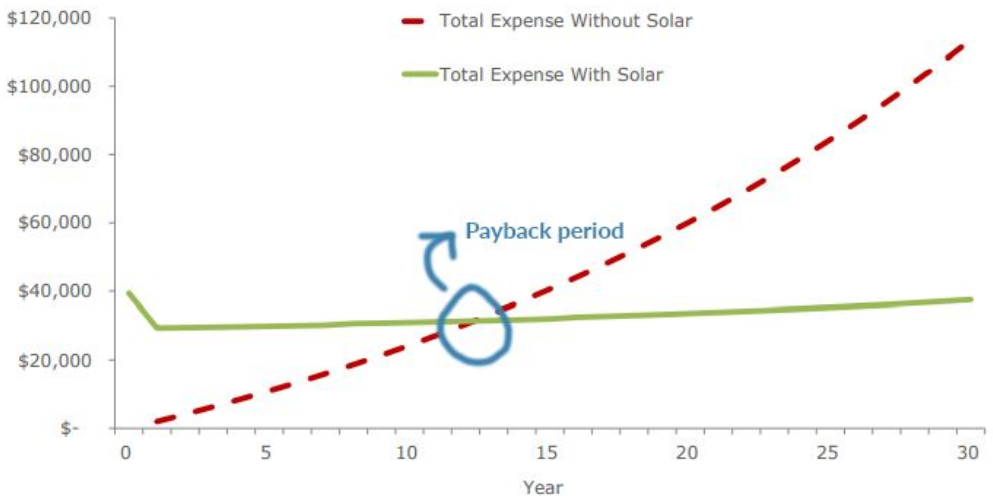
Issues with Decommissioning (1)

- High labor costs of removal
- Recycling costs
- Some sites are perfect for solar / will have solar reinstalled!

Issues with Decommissioning (2)

- Economic Inefficiency = Waste if we don't have solar sites active

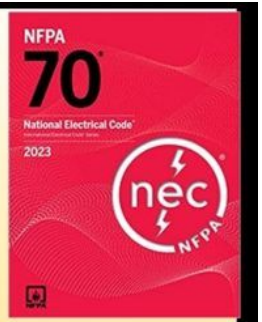


Issues with Repowering (1)

- Investment costs
- Permitting challenges

2023 NEC

5,962 Public Suggestions
2,705 Revisions Made
Changes Include
- Editorial Clarification
- Expanded Requirements
- New Requirements
- Deleted Requirements



Issues with Repowering (2)

- Infrastructure compatibility
- Energy production disruptions + Unknowns

Issues with Repowering (3) - Avoiding the Inevitable?

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Economic Impacts of Repowering

- Short-term financial benefits
- Energy output can come online much quicker

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Economic Impacts of Decommissioning

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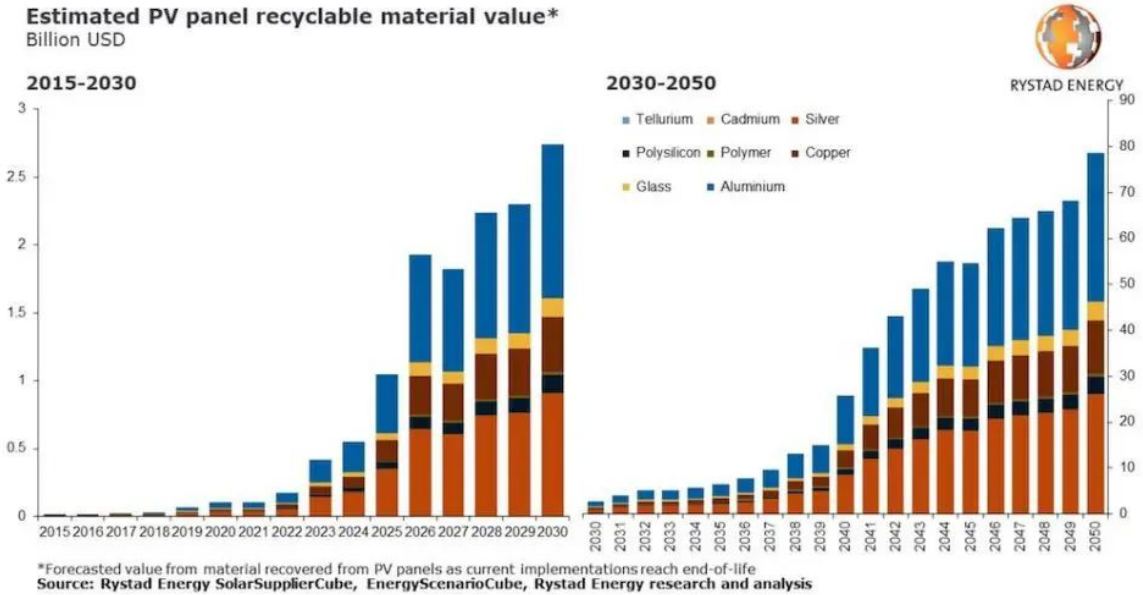
- Financial implications
- Benefits of material recovery



Environmental Considerations

- Impact comparison determines the sustainability of repowering
- Ongoing O&M makes a difference
- Types of technologies are critical
- Resell of remaining assets is a key factor: Energybin

Changing the Cost/Benefit with Innovative Approaches

- Innovations reducing decommissioning costs.
- Technologies enhancing repowering benefits.
- Potential to shift economic decisions.
- Visual: Diagram of technology impact on cost/benefit analysis.

Approaches to Solar End of Life - Customer Choice

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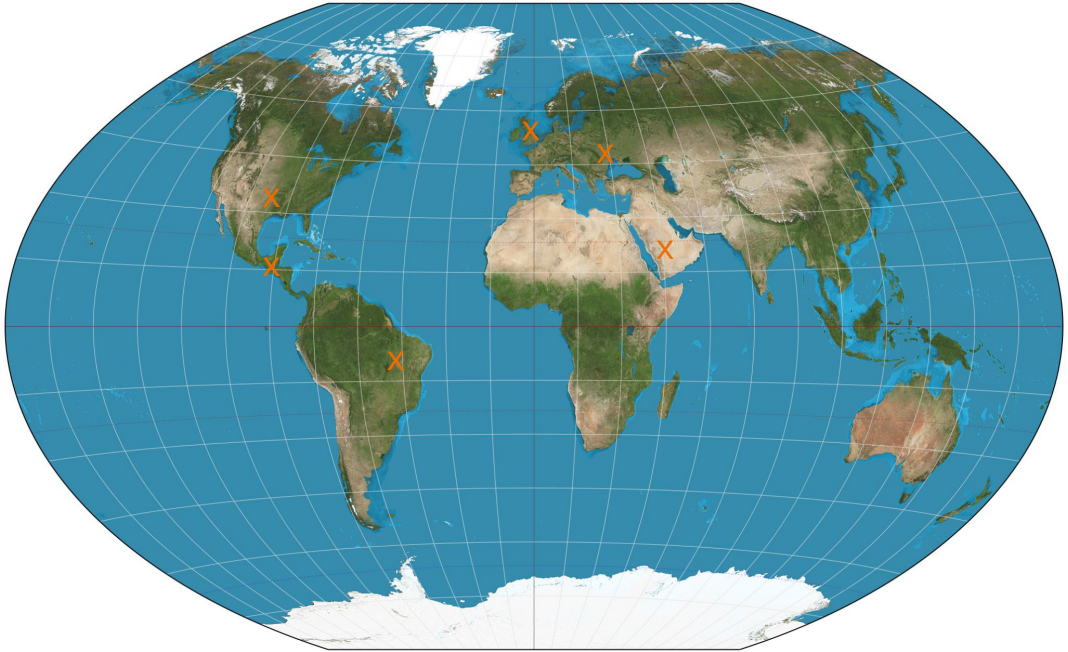
- High Labor Cost / Research
- Not always possible in every market
- Let client choose with all the options that you have presented

Approaches to Solar End of Life - Sustainable Option Only

- Good for sustainability metrics
- Bad for business, if you don’t clarify assumptions in your bid

Approaches to Solar End of Life - Niche Focus

- Focusing on this kind of work builds relationships
- Relationships create local, regional, and international options



Main Determinant? Feasibility

- Cost
- Labor
- Technological Ability
- Client Engagement

Solution?

- Your Site Walk
- Client Discussions

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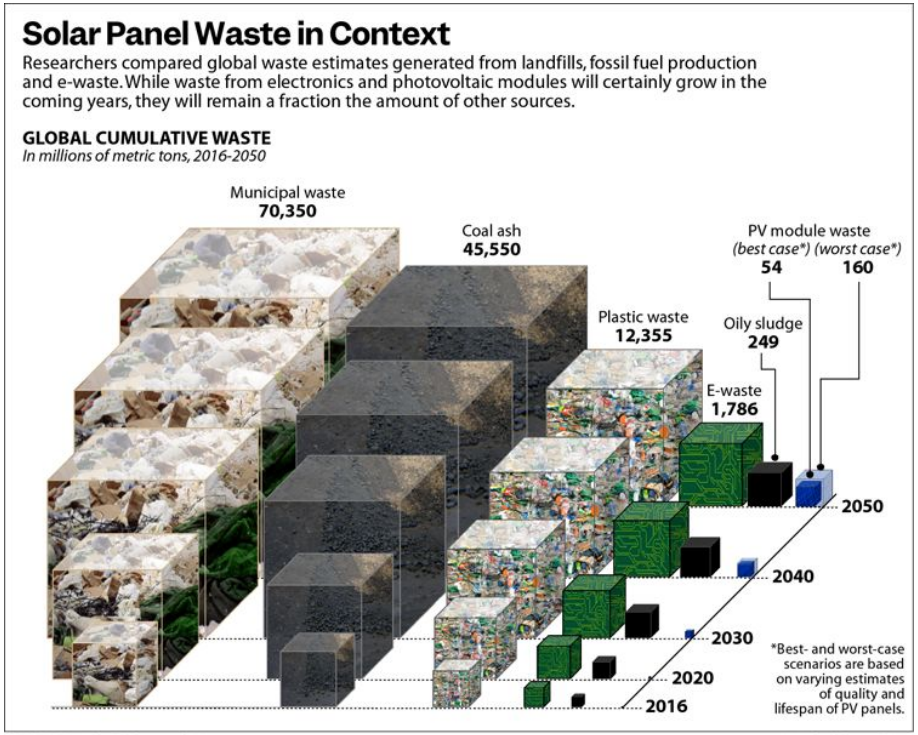
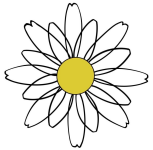
Boosting Client Engagement

- Marketing repowering
- Creating potential for collaboration
- Appropriate provisions and explanation of options
- Typically less up front cost compared to decom/new install

Conclusion + Reality Check





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Entrepreneurship as Environmental Justice: Transforming Inclusive Site Selection into an Economic Powerhouse

Saxon Metzger

Introduction - Welcome and Overview

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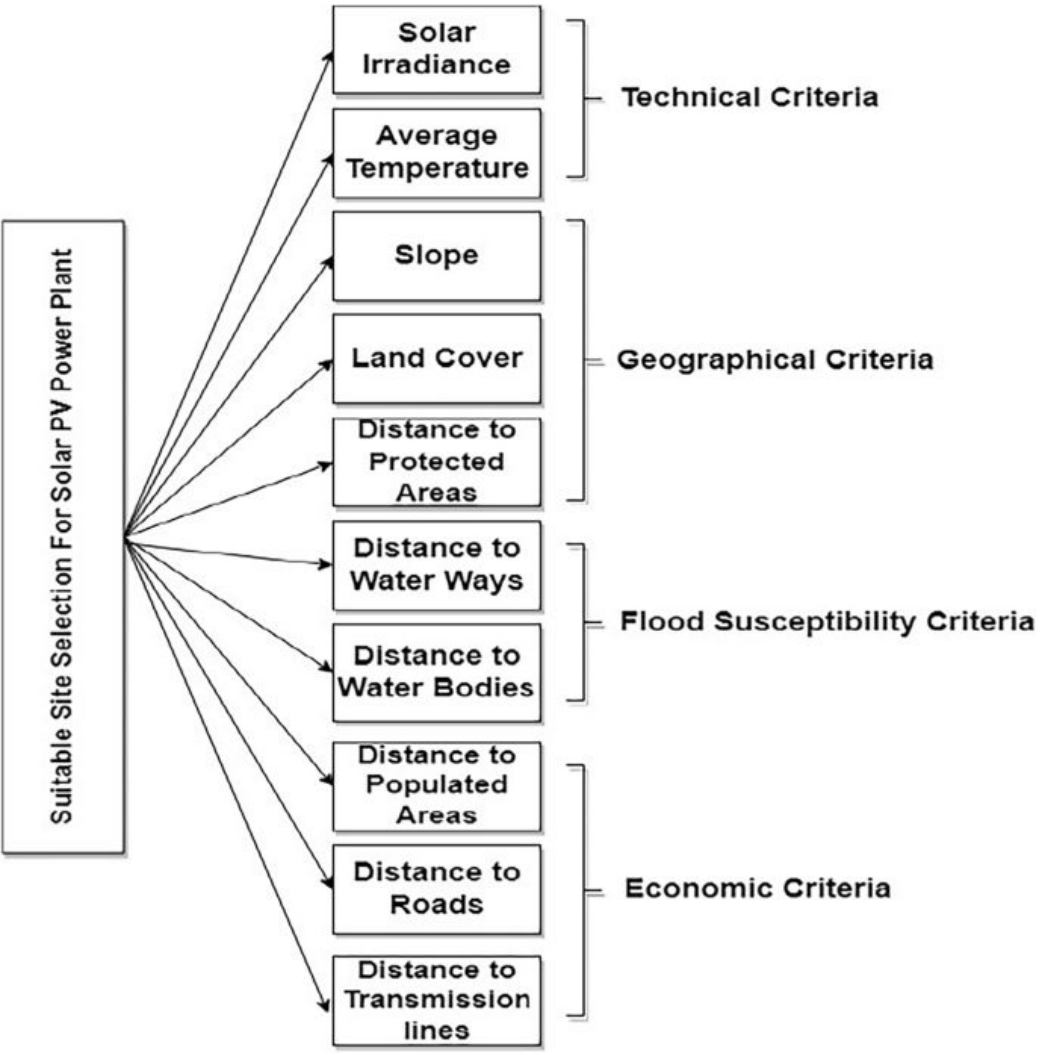
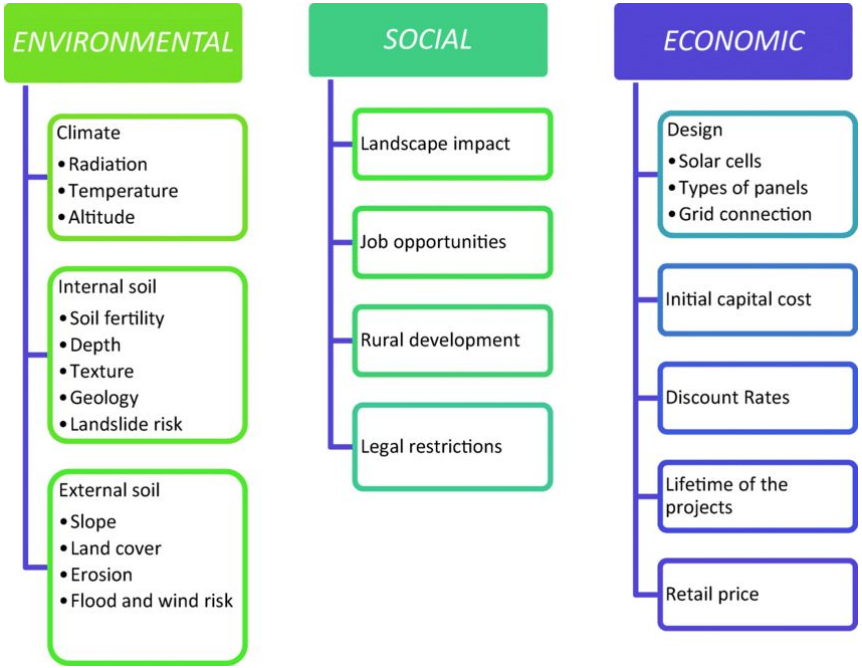
Current Site Selection Considerations





Inclusivity - A New Paradigm Entirely

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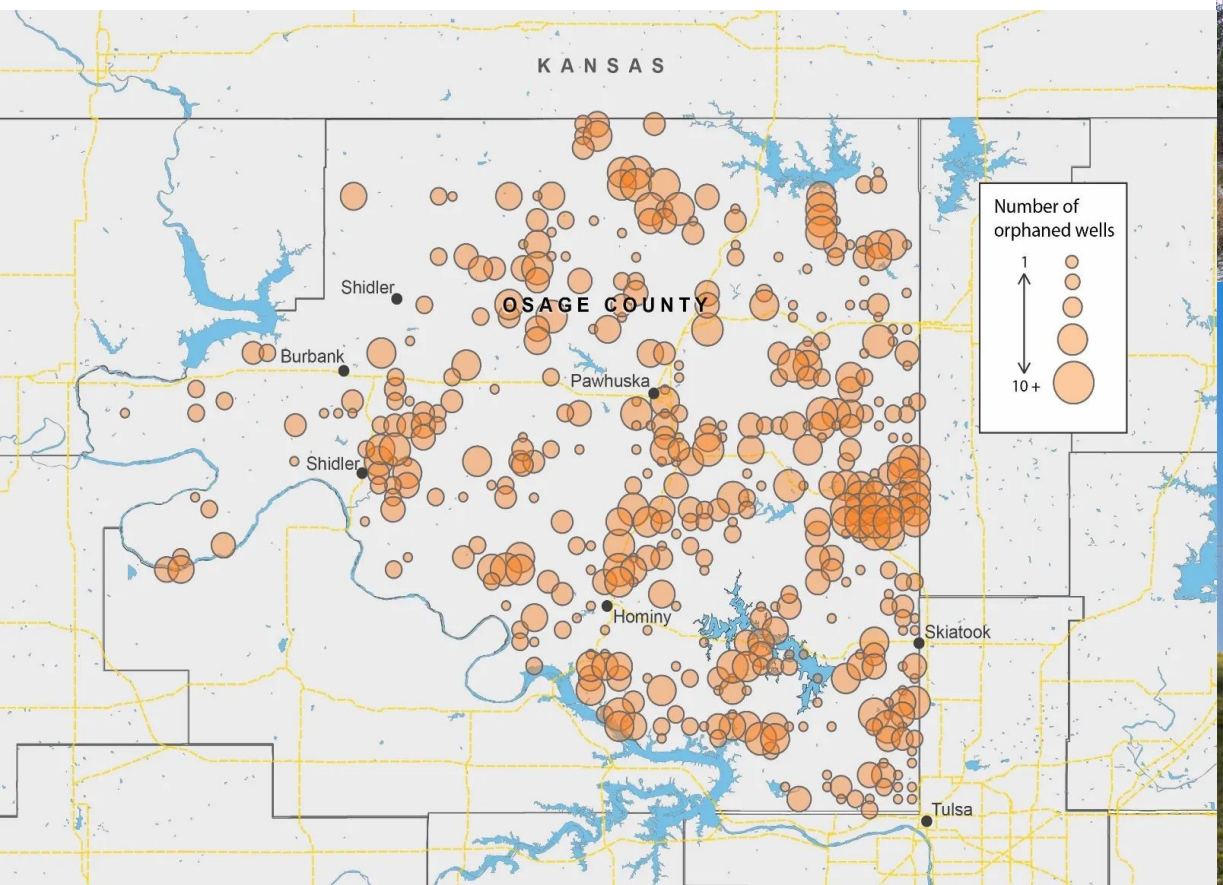
- Definition: the fact of including all types of people, things or ideas and treating them all fairly and equally.
- Each part of that definition has huge implications and reflections for the renewable industry:
  - All types of people
    - Identifying a full picture of the community
    - Identifying truly local issues
  - Things or ideas
    - What are the concepts you are unfamiliar with?
    - Indigenous perspectives
  - Treating them all fairly and equally
    - What does that really mean?

Inclusivity and Entrepreneurship

- Definition: one who organizes, manages, and assumes the risks of a business or enterprise
    - Determines “Risks of a business”
    - Organizes/Manages

Inclusion Without Decision Making Causes Issues



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Inclusivity - Economic Impacts

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- Data is clear: when we don't have diverse perspectives, everyone suffers economically
- Projects will stall, fail, and get delayed
  - Osage Nation - legacy and renewable asset issues
- Inclusion in the entrepreneurship and innovation ecosystems significantly improves economic growth.
  - (Citigroup 2020)
    - Inclusion of women and people of color in the initial stages of innovation would increase U.S. GDP by as much as $640 billion.
    - United States' aggregate economic output would be $16 trillion higher today if identified racial gaps had been closed in 2000.
- Inequality is partially to blame for stagnant productivity growth:
  - (McKinsey 2023) 15 years of a stall in productivity growth caused by: "the unevenness with which the benefits of innovation, globalization, and other shapers of productivity have spread" across the country.
- Jackson State University: inclusive cultures are six times more likely to be innovative

Benefits of Inclusive Site Selection

COMMUNITY TRUST AND VITALITY

&

VIBRANT ECONOMIC GROWTH

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Every Step of the Project Can Be Transformed

- Marketing
- Human Resources
- Land Acquisition
- Operations
- Engineering
- Procurement
- Financing

Opportunities For Established Businesses

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- Inquiry
- Listening
- Applying
- Recognition/respect of mistrust
- Commitment to doing

Opportunities For Communities

- Learning
- Understanding opportunities
- Real participation
- Building progress
- Capacity to caretake

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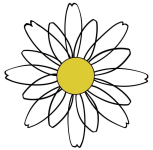

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Questions?

Thank You For Attending!

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It's Decommissioned, Now What? Solutions for Removed Solar PV Material

Saxon Metzger

Introduction - Material Matters

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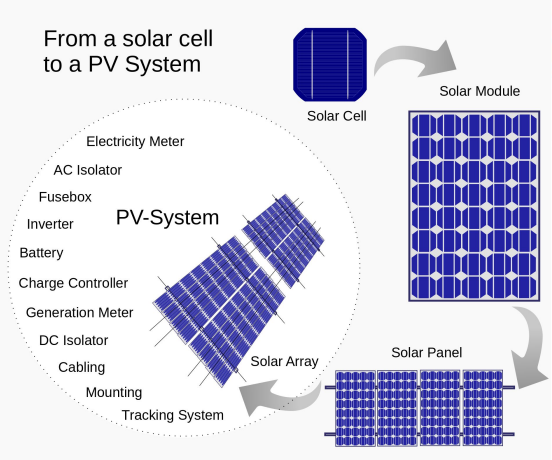
- Goals:
  - Explain current and future supply chains of individual components of Solar PV assets from decommissioned sites
  - Provide insight into repurposing, resell, and other landfill diversion strategies.
  - Clarify how different materials and manufacturers create unique opportunities and challenges

How Much Material Are We Talking About?

- Incredibly complicated supply chains
- Total weight estimate? Varies widely, but HIGH. 40-50+ pound per panel, and equal or exceeding weight for everything else.



Further Complications

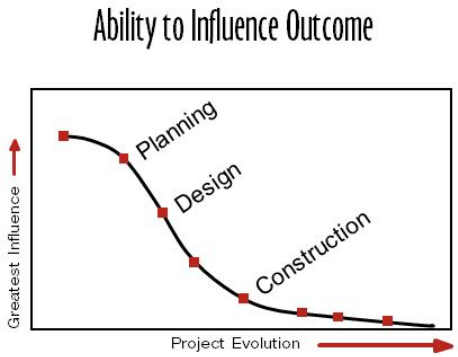
Conduits are generally made of plastic or metals. These protective pipes are classified as

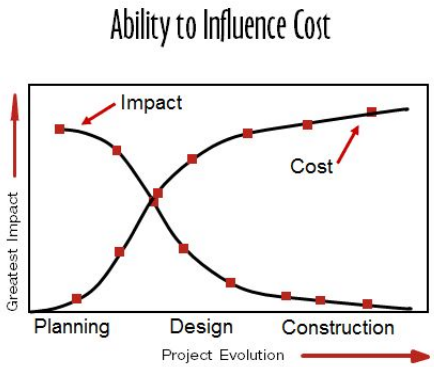
- Rigid steel conduit: Strongest type of conduit, resembles a strong pipe
- Electrical Metallic tubing: 40% thinner than rigid steel conduit. Easier to bend and less durable
- Rigid non-metallic PVC conduit: Made up of rugged plastic. They are used for underground installations. Plastic conduits of this type are cheaper and strong.
- Flexible metallic conduit: Generally steel or aluminum is used to make these conduits. They are fixed in areas where there is an expectation of movement or vibration.

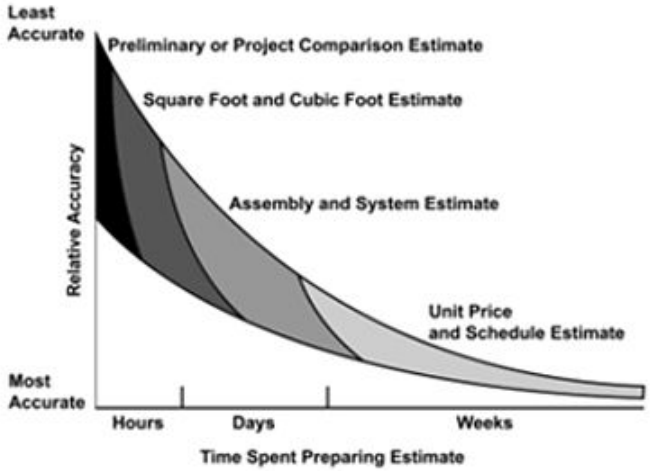
- How many separate materials?
  - Panels
  - Concrete: ballasts and pads
  - Electronics: Inverters, comms box, RSS, combiners, switchgears,
  - Plastic: Rigid
  - Racking and structural metal: typically aluminum, steel, sometimes plastic or rubber elements
  - TPO or other roofing material for slip sheets
  - Wiring: Bare copper wires, PVC wrapped wires, aluminum or steel flex conduit enclosures
- Factored in removal?
  - Pallets
  - Banding
  - Straps
  - Supplies and waste from construction crew

Best Time to Plan?

- Before you've even estimated the price of a project
- What happens if you don't?
  - Excess onsite storage of material
  - Bad estimates
  - Last minute pricing
  - Reduced project efficiencies
  - Frustrated clients
  - Bad press and bad photos







Types of Material to be Decommissioned

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Material People Buy from You

- Some panels!
  - Greater than 300w and in good condition
- Some racking
  - More expensive than it was new!
- Combiners and electrical panels
- Most racking and conduit
  - Some separation is key here

Material You Pay Folks to Take Away

- Inverters, RSS, - E-Waste you pay to recycle
  - Exception: salvageable parts, or if there's immediately nearby need
- Anything rubber or plastic
  - Slip Sheets
- Ballast
  - Concrete pads for EBOS as well
- Attachment points
  - Exception: Can it be reused and under warranty?
- Pallets
  - Panels arrive on pallets and leave on pallets

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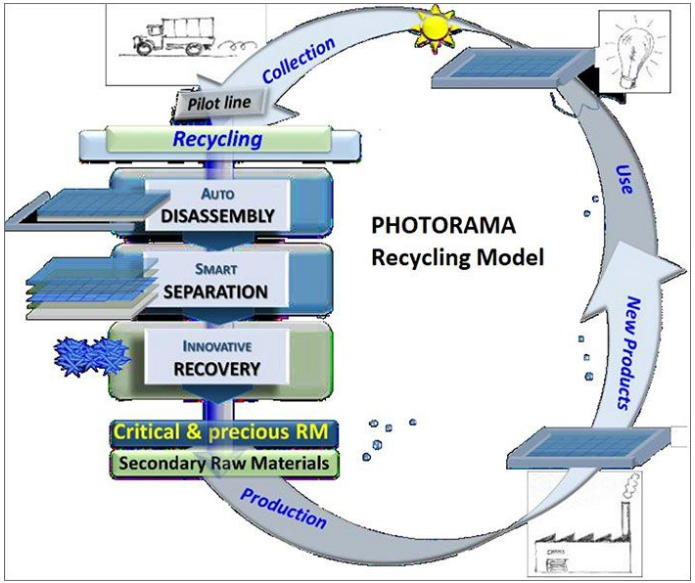
Recycling

- Won't focus heavily here, but there's good news
  - Approximately 40% of all new panels could be made with old panels
- Recycling is not the only or best option for every situation
  - Is the material really ready to be recast?
- It's getting better!
  - Take Back Programs from module manufacturers
- Recycling beyond the panels:
  - Metal and E-Waste: Separated and sold
  - TPO melted and reformed
  - Pallets to mulch
  - Concrete
    - Aggregate
    - Erosion control
    - New concrete additive
    - Utility pipe bedding



Reduce

- By the time solar is installed, most material is committed
  - Later presentation will review lessons learned to help our future decommissioning contractors!

- Removing solar from a roof does require excessive material, and risks issues
  - Construction site waste
  - Causes:

Lack of knowledge of demolition contractors
Wasteful use of materials on-site
Inappropriate packaging
Low quality of buildings materials
Inappropriate methods for handling on-site
Inefficient procurement
Inappropriate inventory
Inappropriate methods for shipment
Frequent demolitions

- Solutions?
  - Reusable pallets, straps, banding
  - Water jugs and sustainable packaging for any meals provided
  - Training!

Reuse Solutions

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- Can you or a partner organization use these for O&M or R&R projects?
- Can you donate these to a worthy cause?
- Can you resell these to recoup costs?
  - Going it alone?
  - Marketplaces
- Special Cases:
  - Art
  - Rural or indigenous community microgrid

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Examples of Repurposed Panels - Art

Artist: Cruz Ortiz

http://www.cruzortizart.net/

Fully functional panel, celebrating San Antonio's recognition as the National Wildlife Federation's first Monarch Butterfly Champion City,

Examples of Repurposed Panels - Art

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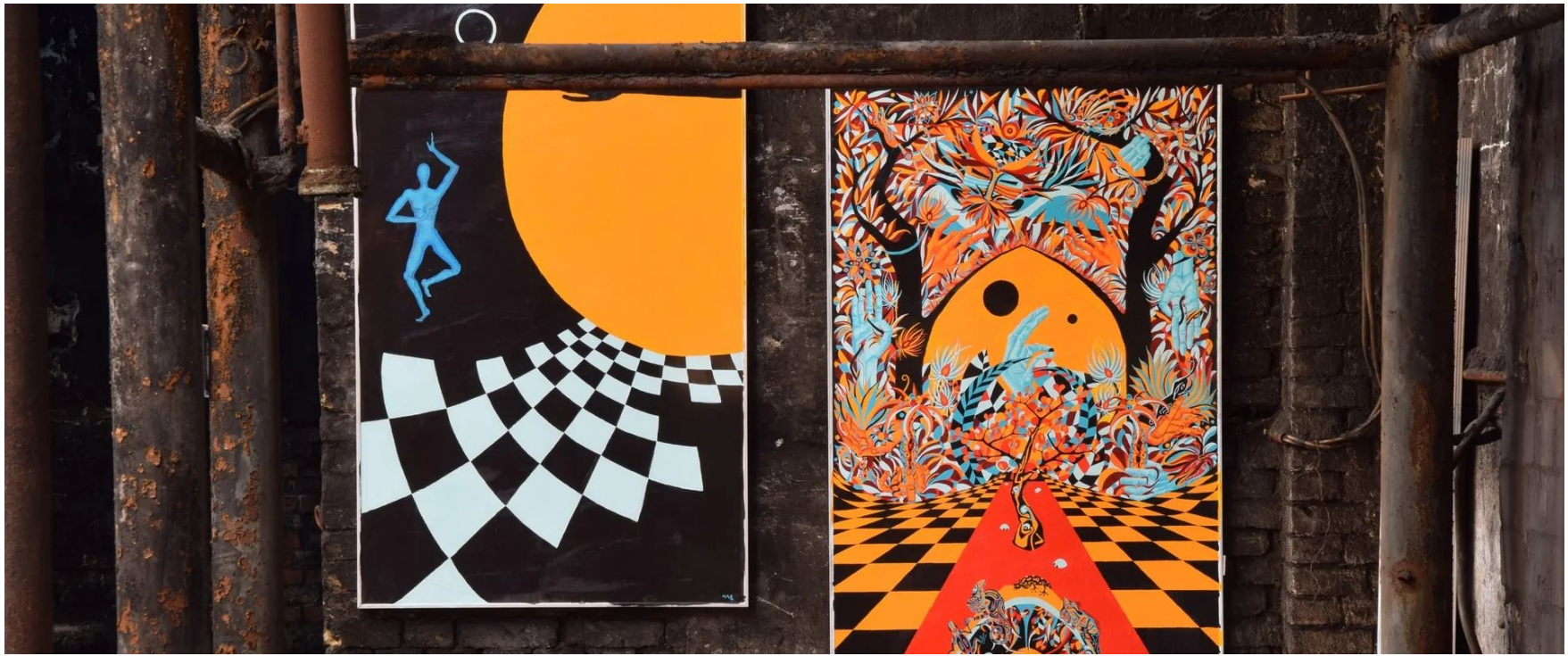
Artist: Abou Aboughazala



Examples of Repurposed Panels - As a Building Block

- In Spain, modules are a cheaper building material than fencing
- Are you even a solar company if you don't have one of these in your office?

What Determines Reuse Possibility?

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- The reality of local logistics
  - International shipping is complicated and expensive even within free trade agreements
  - Domestic shipping harms project economics
- Your connections to the community and within the industry
  - Are you someone people know they can reach out to?
  - Are you someone who reaches out to others about what they have on hand?

What Determines Reuse Success?

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- Can you service the equipment you are installing?
- How long will the material actually last? Warrantied?
    - Some material is only theoretically reusable
        - Wood breaks
        - Inverters/RSS/Combiners are sensitive equipment
    - Removing system components begins to void every warranty on the project
- What's the regulatory and permitting environment you are in?

Reuse Avenues: Online Marketplaces Like EnergyBin

- Excellent option for solar and storage solutions within the United States
- Requires membership
  - Reduces access but ensures a managed selling environment
- Some challenges
  - Ranges in terms of options based on region
  - Typically requires high quality and not particularly old modules to ensure really economically viable material sales

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Reuse Avenues: Charities

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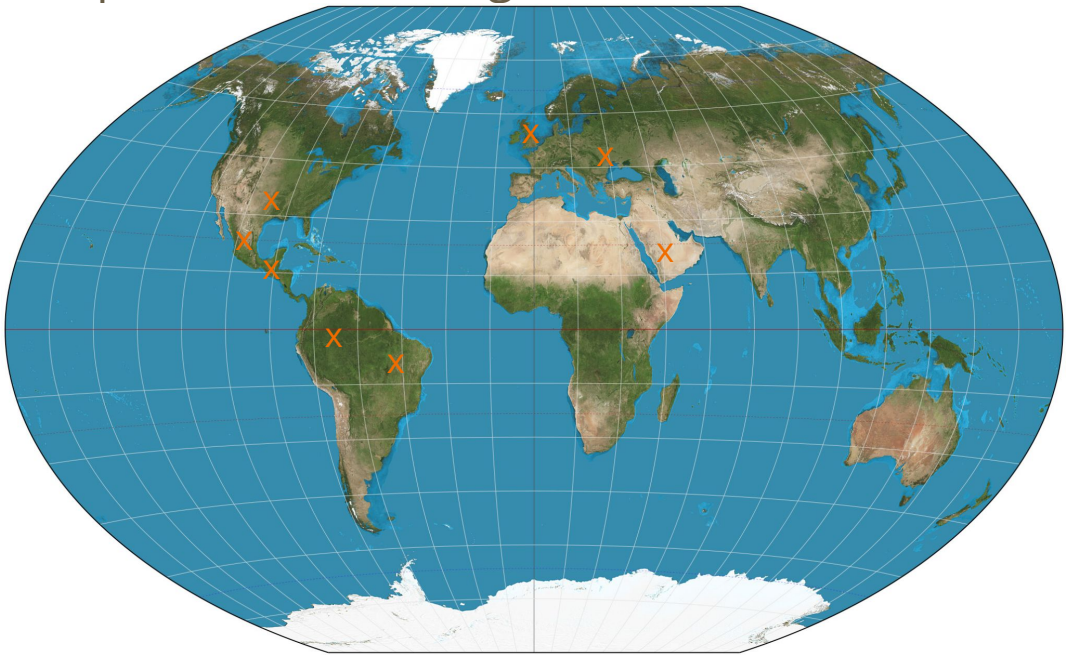
- Donated Labor?
- Tax incentive
- Potential openness to material that isn't brand new
- Creates great publicity
- Projects work: Apollo Energy and Grid Alternatives donated a 40kW system including installation to a multi-family building housing low-income veterans.

- Challenges?
  - Expertise is expensive, lack of expertise? More so
  - Is it cheaper to just buy it new with new tax incentives?
    - IRA passage

The Places Your Material Will Go....

- Focusing on this kind of work builds relationships
- Relationships create local, regional, and international options



Site and Labor Considerations: Security

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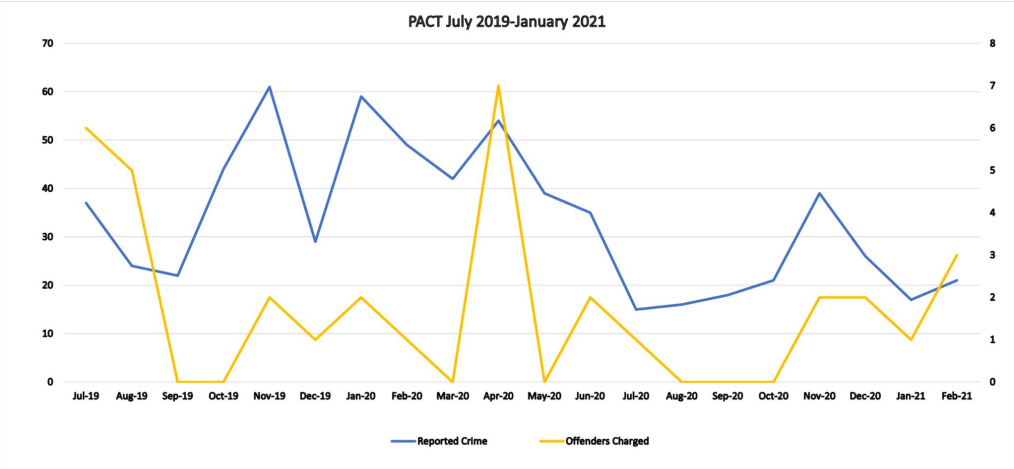
- To sell material, it can't walk off!
- Stats:
  - DOE: $1 billion in copper alone is stolen every year
  - Construction theft is estimated to cost $400 billion
  - You won't get your stuff back
- Personal anecdote: construction sites



Site and Labor Considerations: Labor Efficiency

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- Regardless of next steps, you'll have to consider how to remove from site.
- How much care will dictate speed
- Do you need different equipment?
- Do you need to band and strap, or just toss into a bin?

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How to Find Solutions

- Linkedin / Existing Professional Networks
- Be Patient
- Everyone Wants Quotes. Prioritize
- Review local options
  - Storage
  - Recycling centers
  - Regional construction and logistics partners

Conclusion

- Begin planning now!
- Are you responsible for Decommissioning?
- Have you confirmed your bond and estimates based on real quotes?

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Questions?

Thank You For Attending!

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Protecting Our Future: Tools for Sustainable Businesses to Support Equitable Workforce Development

Saxon Metzger

Sustainable Practices

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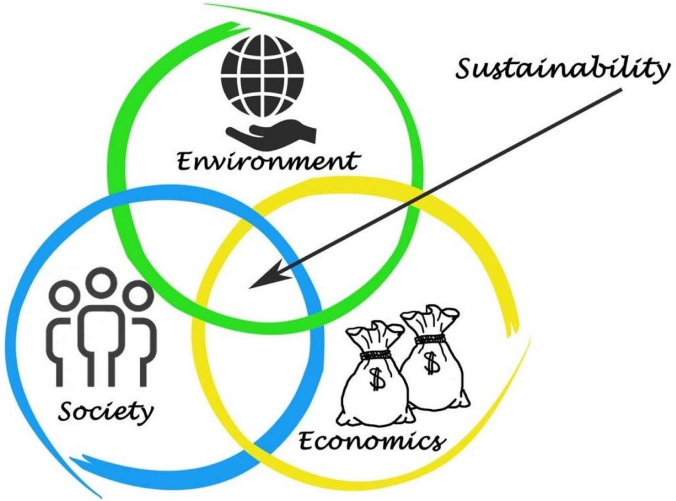
- Common themes:
  - reducing waste
  - conserving energy
  - responsible materials sourcing
- Renewables firms:
  - Improving carbon offset
  - Providing reliability and resilience
- All methods to achieve impact

The Importance of Sustainable Businesses

- Business and sustainability aren't separate
- Unsustainable business is bad business
- Bad business has a human cost
- An equitable workforce is integral to sustainability



Lack of Equity Derails Sustainability

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- Impact of unsustainable practices is inequitably distributed
  - Women are disproportionately impacted by all of the challenges highlighted in the UN's Sustainable Development Goals (SDGs)
  - Indigenous disenfranchisement
- Environmental issues can't be resolved without equity
  - Seemingly good policies fail:
    - Public transport: Optimizing for traditional 9-to-5 commutes rather than school pickup routes, accessibility, safety
    - Carbon pricing or taxes: Regressive burden for economically disenfranchised.
  - Similarly, in one case, climate-driven efforts to install "clean" cooking stoves were discontinued when organizers realized their impact on emissions was smaller than initially expected, disregarding the unexpected positive byproduct that these stoves improved women's and children's health and safety.

Impacts = Results of Living Into Culture

- Business is based on a calculation
- Bad math exists:
  - Failing to include human inputs
  - Underestimating far more common
- Culture is set by leadership but put into practice by staff
  - Only 7% of Americans are owners

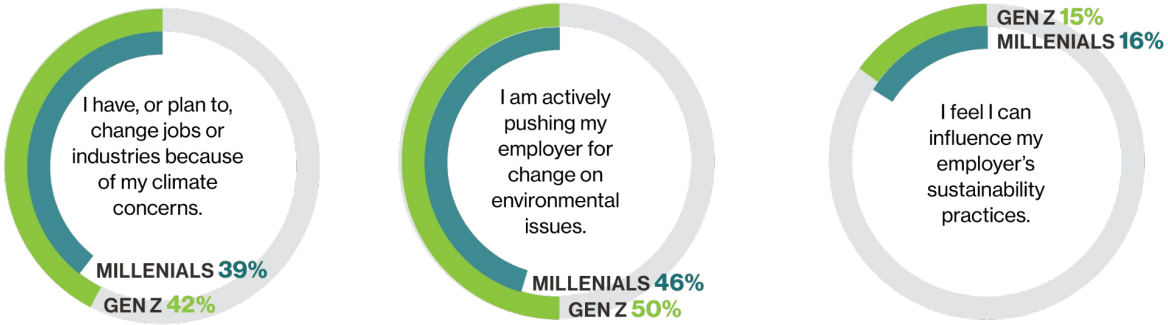
Workforce Development is Key

- Working life vast majority of your life
- Role models
- Generational impact
- Expertise and influence
- People know their communities best
- Business actively engage out of necessity
- Businesses serve “boring” logistics
- Commercial capital has more impact

Benefits to Industry

- Companies in the top quartile for ethnic diversity are 36% more likely to outperform their peers financially
- Gender-diverse companies are 15% more likely to see higher financial returns.
- Productivity: Inclusive teams are over 35% more productive.
- New markets: Diverse companies are 70% more likely to capture new markets
- Equity leads to higher retention rates and reduced turnover by fostering a sense of belonging and loyalty among employees…. Even those not from marginalized communities.

Gen Z and millennials are factoring ESG into career decisions



Source: Compiled by MIT Technology Review Insights with data from Deloitte, 2023.

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What Can An Employee Do?

- Raise the issue
- Support those raising the issue
- Expect, Inquire, Inspect
- Hold yourself and others accountable
- Offer what you can
- Invite the uninvited
- Be open to unique solutions
- Show up where you rarely go

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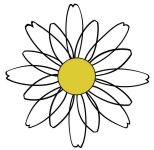
What Can Your Organization Do?

- Inquire as to real goals
- Have a strategy
- Invest resources
- Have a policy
- Track outcomes
- Acknowledge issues / course correct



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Training: NABCEP

NABCEP®

Raising Standards. Promoting Confidence.

Overview

- **Definition**: NABCEP is the most widely recognized certification organization for North American solar professionals.

- **Mission**: To develop and implement quality credentialing and certification programs for professionals in the renewable energy industry.

Benefits

- **Training Programs**: NABCEP partners with over 100 educational institutions to provide accessible training programs, ensuring a wide reach and inclusivity.
- **Community Outreach**: NABCEP's initiatives include targeted outreach programs in underserved communities, resulting in a 20% increase in certification participation from these areas.
- **Diversity in Certification**: 35% of NABCEP-certified professionals come from underrepresented groups, including women and minorities.
- **Job Placement**: 85% of NABCEP-certified individuals find jobs within three months of certification.
- **Salary Increase**: NABCEP-certified professionals earn, on average, 15% higher salaries compared to their non-certified counterparts.
- **Career Advancement**: 70% of certified individuals report career advancement opportunities within a year of certification

Certifications: B Corp

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Overview

- **Definition**: B Corp Certification is a designation that a business meets high standards of verified performance, accountability, and transparency on factors from employee benefits and charitable giving to supply chain practices and input materials.
- **Criteria**: Businesses must score well on treatment of workers, customers, community, and environment.
- **Global Reach**: Over 3,500 certified B Corporations in 74 countries across 150 industries.
- **Examples**: Ben & Jerry's, Patagonia

Benefits

- **Brand Differentiation**
- **Attracting Talent**
- **Investment Opportunities**
- **Community Impact**

Lessons Learned

- **Transparency**
- **Continuous Improvement**:

- **Employee Satisfaction**: B Corps report a 14% higher employee satisfaction rate compared to non-certified businesses.
- **Environmental Impact**: B Corps are 2.5 times more likely to reduce their carbon footprint compared to traditional businesses.
- **Community Impact**: 82% of B Corps engage in initiatives to support local communities, compared to 52% of traditional businesses.

Community Partnerships

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Description: Collaborating with local organizations to create employment pathways.

Benefits: Strengthens community ties and supports local economic development.

Examples: Partnerships with schools, workforce development agencies, and nonprofits to provide job training and placement services.

Statistics:

- A study by the Urban Institute found that community partnership programs increased local employment rates by 15%.
- Businesses that engage in community partnerships report a 30% increase in community trust and support.
- Workforce development initiatives in collaboration with local organizations lead to a 40% higher job placement rate for participants.

Partner Organizations: Grid Alternatives

Overview

- **Definition**: Grid Alternatives is a nonprofit organization that brings solar power and solar jobs to underserved communities.
- **Mission**: To make renewable energy technology and job training accessible to underserved communities.
- **Programs**: Includes Solar Installation Training, Tribal Program, International Program, and Women in Solar.
- **Impact**: Installed over 16,000 solar systems, providing over $480 million in lifetime savings for low-income households.

Benefits

- **Community Empowerment**
- **Environmental Impact**
- **Economic Savings**
- **Workforce Development**

Statistics

- **Workforce Development**: Over 30,000 people trained through Grid Alternatives' programs.
- **Diversity and Inclusion**: 60% of trainees come from underrepresented groups in the solar industry.
- **Economic Impact**: Generated over $250 million in wages for trainees and workers involved in their projects.
- **Environmental Benefits**: Grid Alternatives' installations have prevented the release of over 750,000 tons of greenhouse gases.
- **Community Engagement**: Partnered with more than 500 community organizations to deliver their programs, strengthening local support networks and engagement.

Applied Education: Internships

Internships

- **Description**: Providing paid internships targeted at underrepresented groups.
- **Benefits**: Offers hands-on experience and a pathway to full-time employment.
- **Examples**: Paid internships for women, minorities, and low-income students in renewable energy fields.
- **Statistics**:
  - According to the National Association of Colleges and Employers, 56% of students who intern with companies are offered full-time positions.
  - The Solar Foundation reports that internship programs in the solar industry have led to a 25% increase in workforce diversity.
  - Sustainable businesses with internship programs see a 20% higher retention rate among employees who start as interns.

Educational Outreach

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Description: Engaging with educational institutions to promote renewable energy careers.

Benefits: Raises awareness and interest in renewable energy among young people.

Examples: Sponsoring STEM programs, providing guest lectures, and offering scholarships.

Statistics:

- The Department of Education notes that schools with strong industry partnerships see a 50% increase in students pursuing careers in those fields.
- Educational outreach programs result in a 35% higher enrollment in renewable energy-related college courses.
- Companies that invest in educational outreach report a 25% boost in brand recognition and positive perception among young adults.

WRISE
Women of Renewable Industries and Sustainable Energy

Conferences and Seminars

Tribal Energy Equity Summit

Description: Hosting or participating in seminars and workshops focused on equitable workforce development.

Benefits: Shares knowledge, fosters industry collaboration, and highlights best practices.

Examples: Organizing seminars on diversity in the renewable energy sector, and participating in industry conferences with a focus on workforce equity.

Statistics:

- According to the International Renewable Energy Agency, industry conferences that focus on diversity and inclusion have led to a 30% increase in women and minority participation in the sector.
- Seminars and workshops on workforce development result in a 20% increase in collaboration between businesses and training institutions.
- Attendees of these conferences report a 40% higher implementation rate of equitable workforce practices within their organizations.

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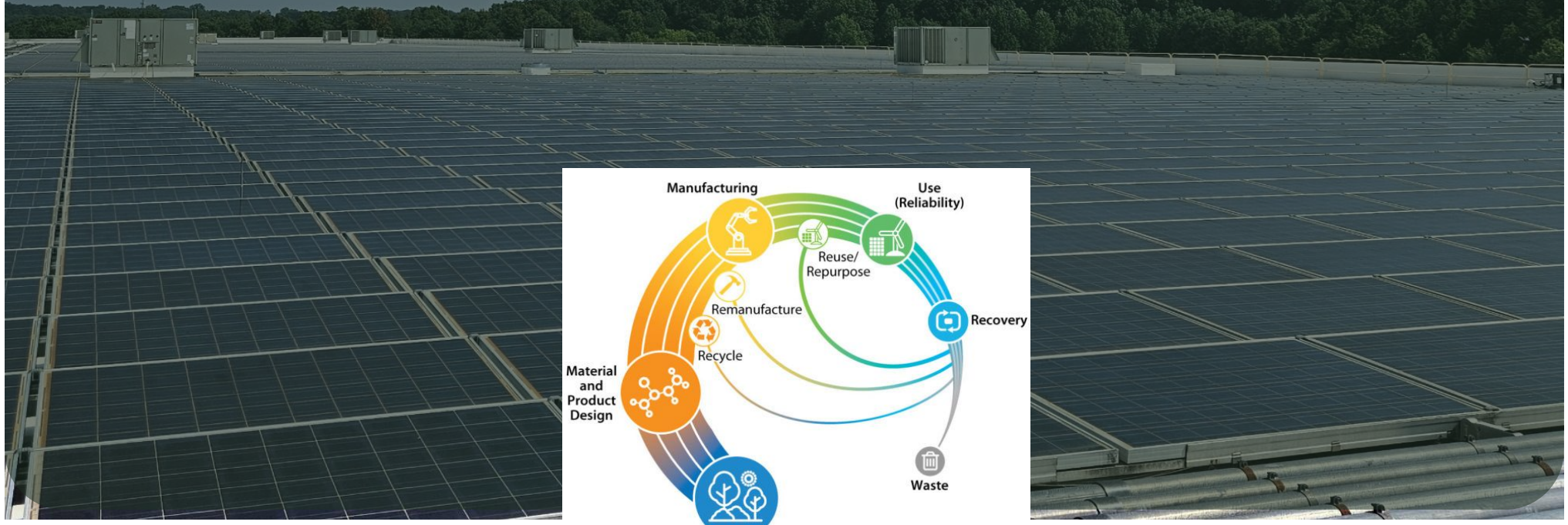
Indigenous Communities and Decommissioning:

Understanding the End of the Renewables Lifecycle for Community Optimization

A Brief Introduction to Solar End-Of-Life/Circularity

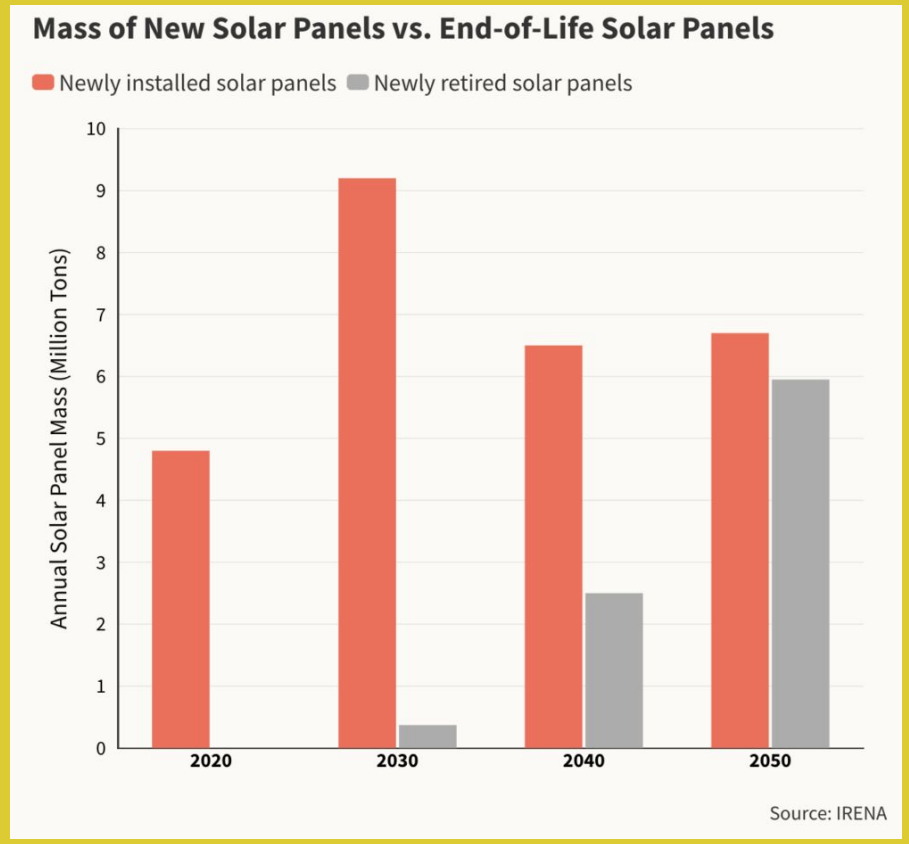
What is decommissioning?



Renewable Rebirth: Indigenous Stewardship in Decommissioning

- The spiritual and cultural significance of decommissioning to indigenous tribes– Indigenous people are critically affected by environmental degradation and material extraction
    - Minimal resources to insulate themselves from the consequences
    - World Bank estimate: 80% of biodiversity maintained by indigenous people
    - University of Queensland: 54% of material for energy transition is on indigenous land
    - North America: 75% of lithium, copper and nickel reserves and resources are within 35 miles of Native American reservations.

It's a Big Issue, and Big Business



Best Time to Plan?

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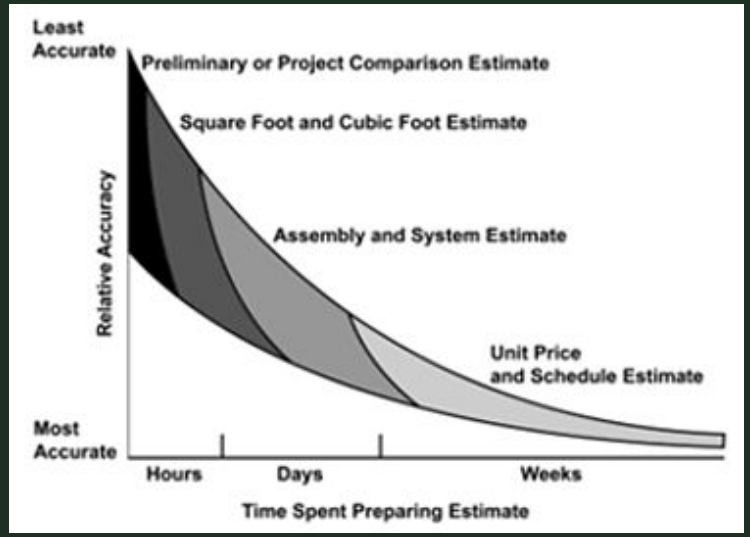
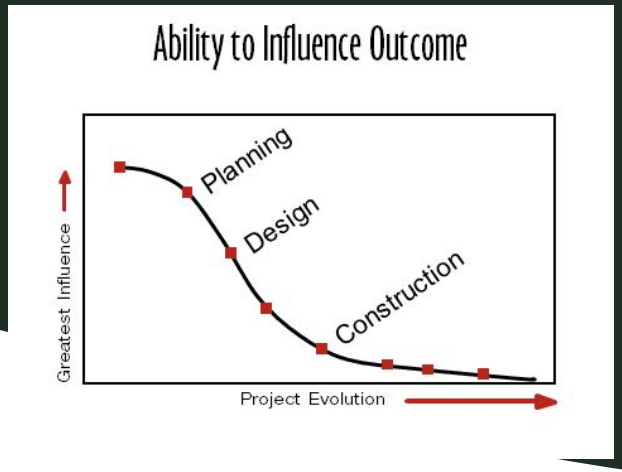
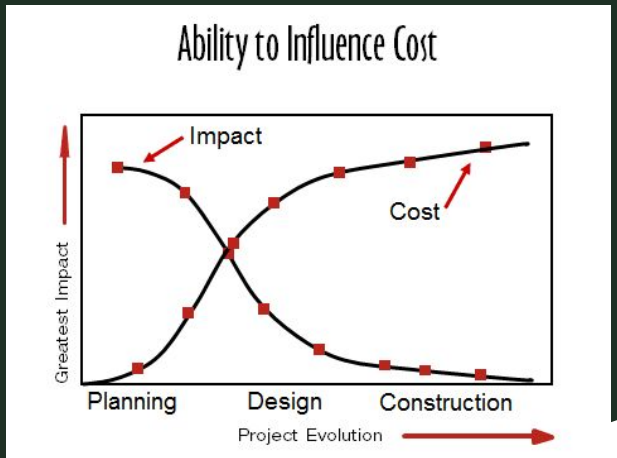
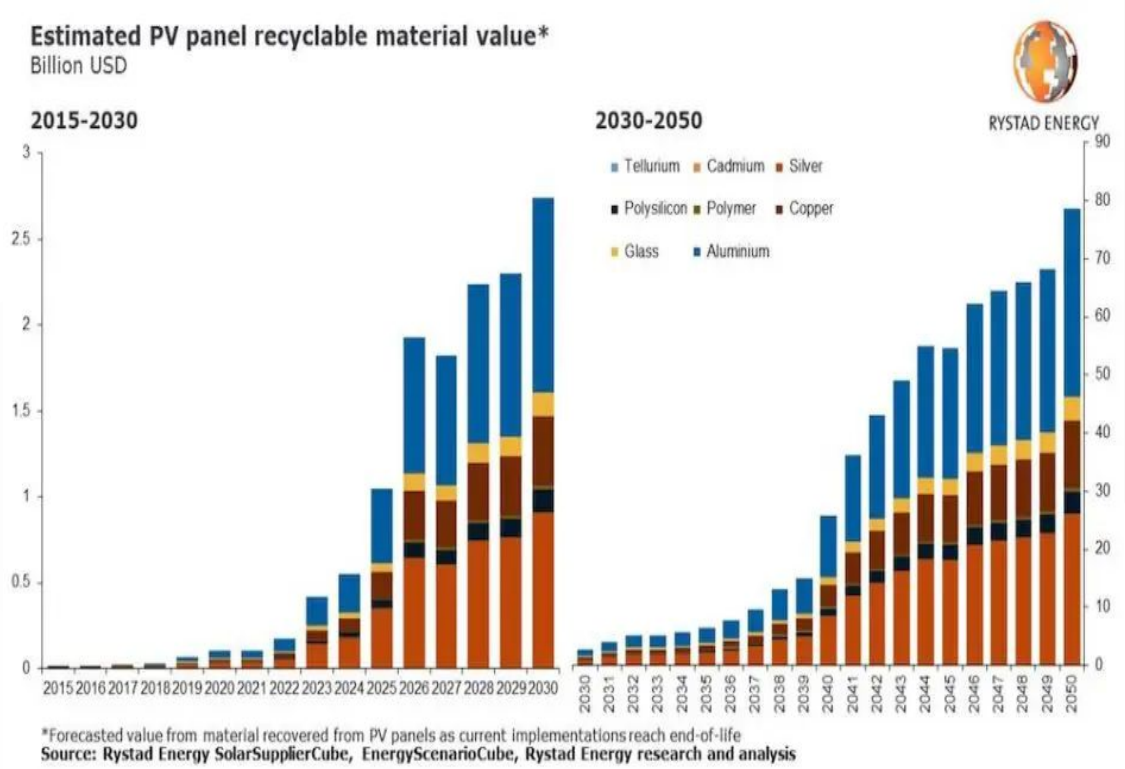






Economic Impacts of Decommissioning



- Financial implications
- Benefits of material recovery

History and Future of Waste

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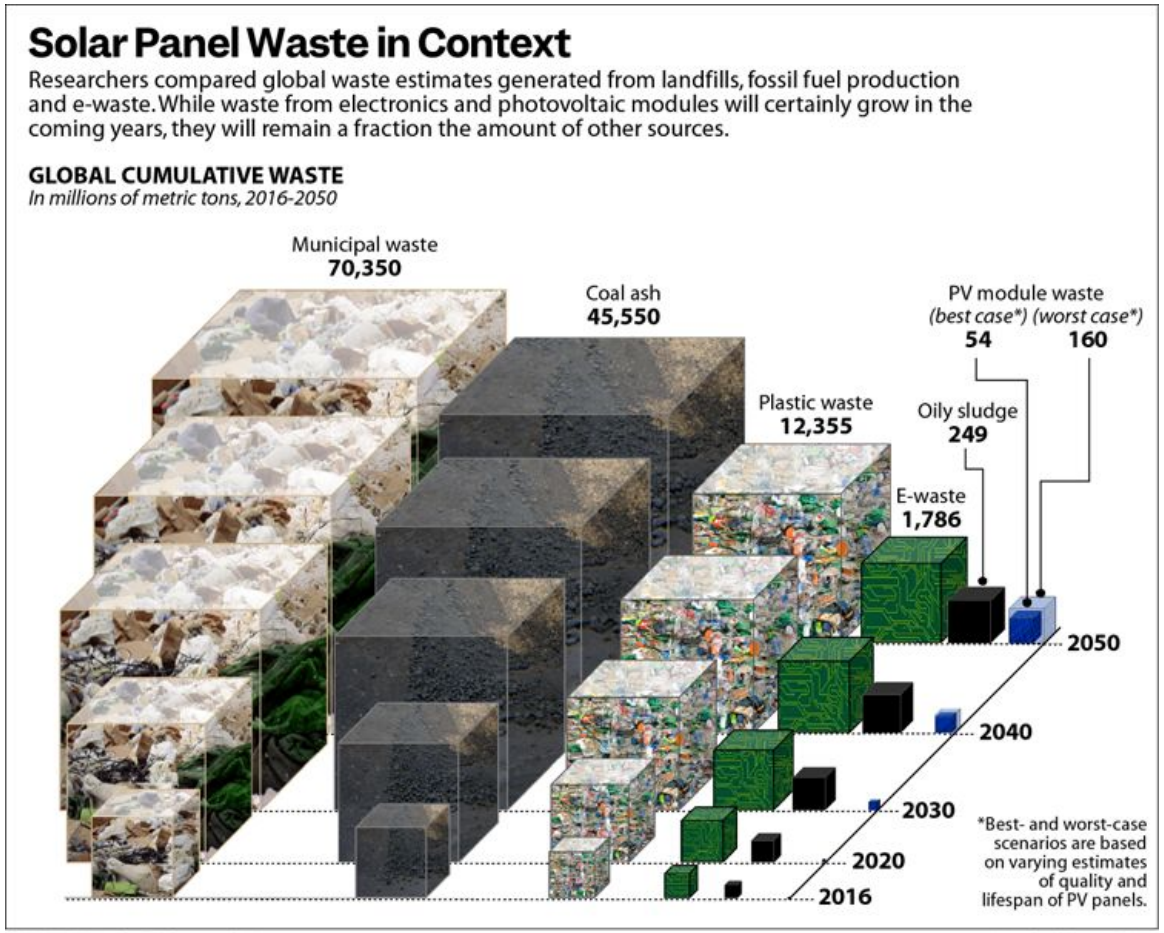

Closing the Loop: Sustainable Decommissioning for Indigenous Communities

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- 40% of all new panels could be made with material from decommissioning by 2050
- Bad installations and bad siting is waste
- Waste kills - people and communities

Decommissioning Best Practices: A Tribal Perspective

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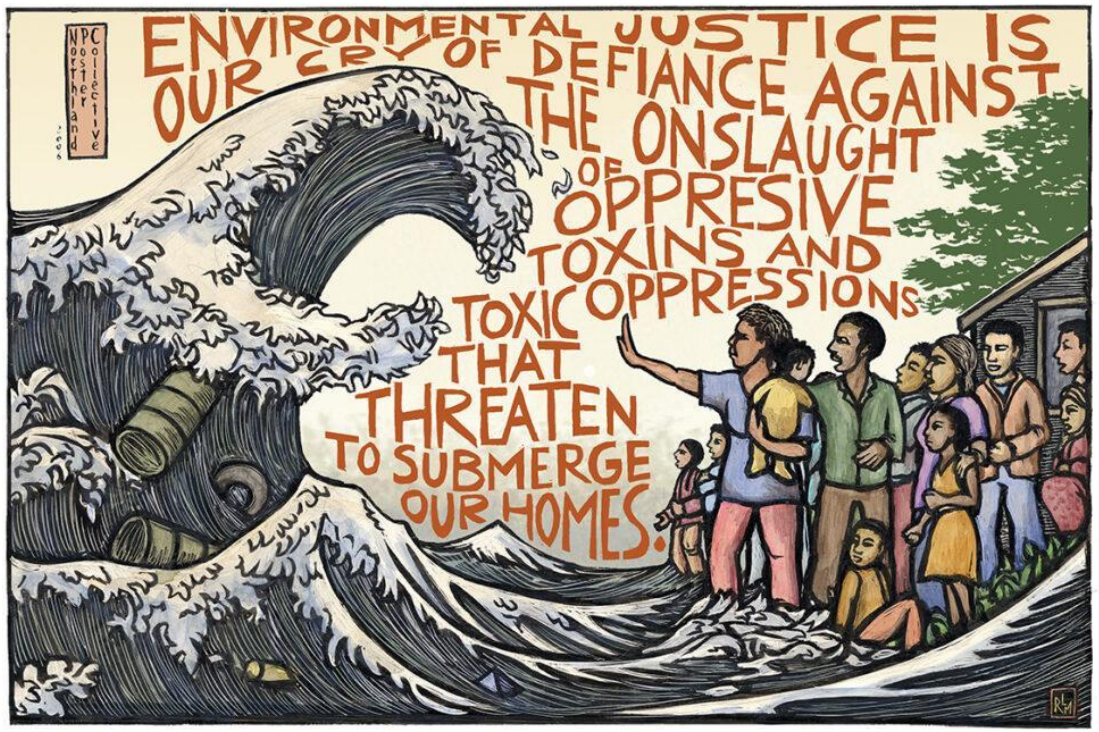
- Community Sensitivity
- Community Engagement

Empowering Tribes: Renewable Energy Lifecycle and Decommissioning

- The reality is that waste affects indigenous people
    - 90's report: 50% of all tribes were being solicited for hazardous waste
    - History of uranium on Navajo land
- Capacity building is key

Decisions Shouldn't Be Accidents



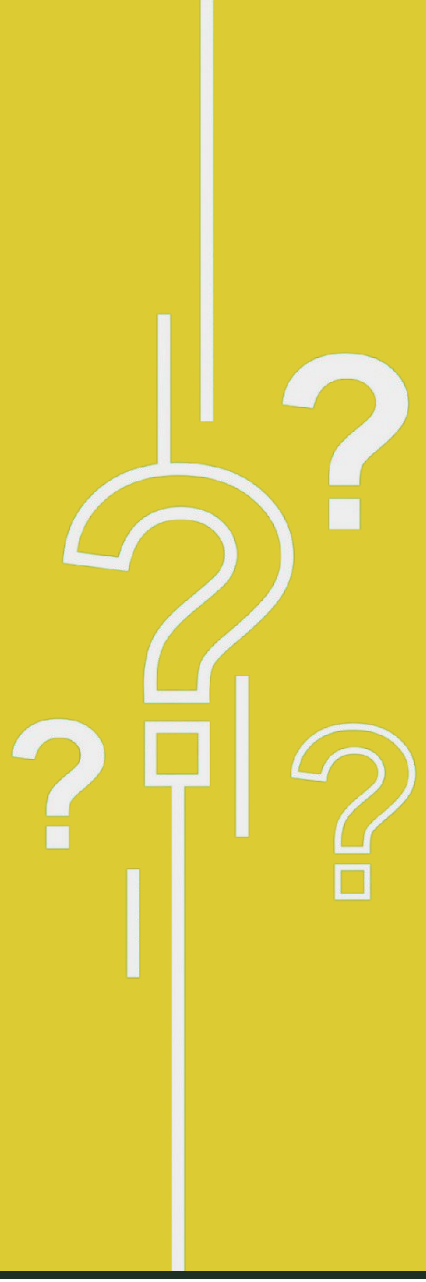
- The choice of a project location will dictate how the project is built, maintained, and treated at end of life
- Infrastructure doesn't just appear
- Decommission planning set and budgeted for decades in advance

Maximizing Community Benefits: Indigenous Decommissioning Strategies

- Community benefits are real
- Indigenous involvement can enhance these benefits

Closing the Gap: Tribes and Renewable Energy Decommissioning

- Collaboration is possible
- Partnerships
  - Industry
  - Policymakers



Questions?

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THANK YOU

For Attending!