

OVERVIEW

The U.S. Department of Energy (DOE) Building Technologies Office (BTO) provides technical support to Better Buildings Workforce Accelerator (BBWA) partners to create and improve workforce development programs. As part of this program, the University of Nebraska-Lincoln (UNL), a BBWA technical assistance provider, was chosen to support the City of Milwaukee, a BBWA partner, in its efforts to develop a green jobs program. Initially, the City of Milwaukee and its partners aim to develop a pilot program to **train 30 people of color for jobs in the energy efficiency workforce**. To date, UNL has provided the City of Milwaukee City-County Task Force on Climate and Equity a *summary of successful workforce development programs* that can be leveraged to achieve this objective, including programs designed to recruit, train and employ underserved and underrepresented populations. Of these, workforce development programs in **offsite construction** were viewed as having the most potential to provide energy efficiency job opportunities, particularly for those having risk factors that could lead to incarceration or recidivism.

Construction, particularly in cold weather climates, is often characterized by a transient and seasonal workforce. In contrast, offsite construction in a controlled, factory setting can provide safer and more stable employment opportunities. Offsite construction is the prefabrication of building components at a location other than a construction site. The repetitive nature of prefabrication is more conducive for lower-skilled workers and workers with disabilities. Prefabricated building components can also reduce project cost and time while reducing production materials, waste and life-cycle energy use. The most significant market for offsite construction growth is in **multifamily housing**, increasing from <20% of U.S. projects in 2011 to >70% of projects by 2025.

The City of Milwaukee has the unique opportunity to provide both the supply of a 'green' offsite workforce and, the demand for an offsite workforce through its affordable housing construction programs. If successful, it is anticipated that Milwaukee homebuilders will also increase their use of offsite construction, **increase offsite job opportunities, reduce housing costs and improve energy and materials efficiency**. Building on this success, the program could expand into other green job areas and provide job ladders and advancement opportunities for higher skill and higher wage-earning employment opportunities.

Provided herein is a summary of recommended **training program** development activities intended to *build interest, clarify pathways and improve skills* for an offsite construction workforce.

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Program Model

Proposed is a program pathway with multiple levels of training, credentialing and wage-earning potential. For offsite construction, four (4) training levels are recommended:

- Foundation
- Basic
- Advanced
- Supervisor

For each level, participants should have the opportunity to earn nationally recognized credentials. The program should utilize existing resources wherever possible including certified training providers; recruitment, retention and completion coaches; job placement specialists and other program staff to provide support to program participants. Key to the success of the program is the identification of *stakeholders* and their contribution to recruitment, training, job placement, program management, funding and sustainability.

Stakeholders

Proposed is the establishment of an advisory, oversight or steering committee of program stakeholders from the onset of the project. Stakeholders should help define program objectives and have a vested interest in program outcomes. Stakeholders should also have the expertise and resources to provide planning and implementation guidance and support. The roles and expectations for each stakeholder should be clearly defined to maximize stakeholder involvement and performance. Stakeholders for similar projects generally include a program management entity from a sponsor or grantee. Other stakeholders may include training providers, employers, workforce systems and other organizations. For this project, key stakeholders may include:

Stakeholder	Role
Sponsor	Program Management / Funding
Training Providers	Curriculum / Credentials / Instructors / Facilities & Equipment
Correctional Partners	Recruitment / Retention / Coaching / Facilities and & Equipment
Employers and Industry Orgs	Oversight / Facilities & Equipment / OJT / Employment
Workforce System Partners	Career Counseling / Job Placement / Financial Assistance
Community and Non-Profit Orgs	Transitional Housing / Living Assistance / Support Services

Sponsor

The sponsor or designee provides *program management*. Management responsibilities include the administration of project scope, schedule and budget to include funding, coordinating and documenting project activities. MOUs and cooperative agreements are often established between the sponsor and project partners providing in-kind services. For project partners receiving cost-share funds, investment incentives, subsidies or other forms of financial assistance, the sponsor may administer a competitive or sole-source selection process and contract.

Foundation Level		
NCCER Core		
OSHA 30		
Basic Level		
NCCER Manufactured Construction I		
OJT (500 hours)		
Advanced Level		
NCCER Manufactured Construction II		
OJT (1,000 hours)		
Supervisor Level		
NCCER Project Management		
NCCER Sustainable Const Supervisor		

For this project, the sponsor may also be the guarantor of program produced goods and services, specifically, the buyer of prefabricated building components for sponsor public housing. Such an arrangement may attract industry participation and cost-share investment into production facilities and equipment, and, better ensure job opportunities for program participants.

Training Providers

Training providers for similar workforce development projects include institutional and industry partners specializing in vocational and technical education and training. Institutional training partners may include vocational training schools and community colleges. Industry training partners may include union apprenticeship and training centers. Training provider responsibilities include *skill assessment*, *curriculum development*, *credentialing* and, providing certified instructors, training facilities and equipment. Training providers specializing in adult basic education (ABE) and having flexible, entry-level training programs in construction trades may be most effective for this project.

Correctional Partners

The recruitment, training and employment of men of color from correctional work release programs may be effective for this project. Corrections staff may assist in the *recruitment and retention* of participants through *intrusive coaching*. Corrections facilities may also provide instructional space and other forms of participant re-entry and transition assistance. The use of training tools and equipment and certain other instructional activities at corrections sites may, however, be restricted.

Employers and Industry Organizations

In addition to employing program completers, employers and industry partners may serve as program advisors, providing input on training and the relevance of credentials. Often, employers and industry organizations sponsor participants, donate equipment and provide other forms of in-kind support and, on-the-job training (OJT). For this project, industry partners may be further needed to *provide cost-share investments into offsite production facilities and equipment*, which will likely require investment incentives from the sponsor. Employers and industry partners may include panelized and modular manufacturers, single and multi-family modular homebuilders, modular building associations and trades organizations and, labor unions.

Workforce Systems

Workforce systems include a complex network of non-profit, industry and government organizations that prepare people for employment, help workers advance in their careers, and ensure a skilled workforce exists to support economic development. Organizations such as *Employ Milwaukee* can connect participants to employment opportunities as well as assist in recruiting, training and attracting business development.

Community and Non-Profit Organizations

Organizations such as the *Milwaukee Reentry Council* provide social systems support to individuals returning to the community from periods of incarceration in an effort to disrupt cycles of recidivism.

Training

Proposed is the use of industry recognized training programs. Industry recognized training programs ensure that earned credentials are transferrable to other training programs and to other employment opportunities. These programs generally consist of an accredited curriculum and a learning management system (LMS) that tracks student performance and supports various modes of training delivery. Training programs created or customized for a specific project are often costly, time-consuming and result in credentials that are not recognized outside of the program.

Curriculum

Programs such as the *National Center for Construction Education and Research (NCCER)*¹ *Core, Manufactured Construction Level I* and *Level II* credentials and, the *U.S. Occupational Safety and Health Administration (OSHA)* 30-hour safety training program may be suitable for offsite construction training. Beginning with **Foundation Level**, participants may complete the *NCCER Core* and *OSHA 30-hour* card together. Providing OSHA instruction at the onset of training allows participants to more safely use tools and equipment in training levels to follow. Providing OSHA instruction together with NCCER Core training also allows safety concepts to be contextualized through real-world applications. Providing OSHA instruction together with NCCER Core training also ensures participants will complete both certifications. In other programs having stand-alone OSHA training, more than 70% of participants left the program after earning the OSHA 30-hour card as participants were able to gain employment after earning this credential.

Core <ul style="list-style-type: none">• Basic Safety• Communication Skills• Tools & Equipment• Construction Drawings	Manufactured Construction I <ul style="list-style-type: none">• Carpentry I• Plumbing Systems I• Electrical Systems I	Manufactured Construction II <ul style="list-style-type: none">• Carpentry II• Plumbing Systems II• HVAC Systems I
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The Foundation Level may require 6-9 weeks to complete depending on delivery method. Methods to expedite training, such as all day ‘*boot camps*’ may reduce training to approximately 3-4 weeks. Once completing the Foundation Level, participants may advance to the **Basic Level**. This training consists of basic skills instruction in carpentry, plumbing and electrical systems. With a mix of half-day classroom sessions and labs, the Basic Level can be completed in approximately 6-9 weeks. At this level, participants may begin on-the-job training (OJT) and wage earning employment. Once completing the Basic Level and 500 hours of OJT, participants may progress to the **Advanced Level**. This training consists of basic skills instruction in HVAC and more advanced instruction in carpentry and plumbing systems. The Advanced Level can be completed in approximately 9-12 weeks. Once completing the Advanced Level and 1,000 hours of OJT, participants may continue to the **Supervisor Level**. This final level of certification includes instruction for basic project management and sustainable construction – which may include program specific training on energy code compliance.

Given participants may not have high school equivalency skills, some may have difficulty understanding basic academic concepts needed for craft training such as measurement and geometry. Remedial math skills taught independent of, or, as a prerequisite to occupational training often result in participant discouragement and attrition. Proposed is use of *contextualized teaching and learning (CTL)*, or, the integration of basic academic skills training together with occupational skills training. Beginning at the Foundation Level, basic academic skills along with work readiness skills can be embedded into occupational skills training. Foundation Level training and specifically OSHA 30 training can be delivered in both *English and Spanish* and used to improve English literacy skills together with basic academic and work readiness skills.

¹ <https://www.nccer.org/>

Credentials

For each training level, participants should have the opportunity to earn nationally recognized and transferable credentials. Participants should also have the opportunity to enter and exit training for employment at each level. After completing coursework and OJT, participants will be required to take assessments prior to earning credentials. As proposed, participants have the opportunity to earn up to six (6) industry recognized credentials if they complete all four levels of the program, including:

- OSHA 30
- NCCER Core
- NCCER Manufactured Construction I
- NCCER Manufactured Construction II
- NCCER Project Management
- NCCER Sustainable Construction Supervisor

For similar workforce development projects, more than 80% of participants were successful in earning the OSHA 30 credential. For projects using the NCCER curriculum, roughly 35% were successful in earning the NCCER Core certification. Approximately 10% of participants progress to earn credentials beyond NCCER Core. *Successful participants were generally older adult males and those participating in work release or re-entry programs.* Participation in employment training programs are often requirements for parole and transitional assistance.

Delivery

A modularized curriculum consisting of 1-hour instructional segments has proven most effective and adaptable for a variety of delivery methods to include traditional day and evening courses and all-day or weekend **boot camps**. In-person instruction emphasizing hands-on skills demonstration both individually and in work teams has proven to improve learning, develop stronger bonds between participants and instructors and reduce drop outs. Training at non-traditional program sites such as detention work centers, production facilities and field sites has also proven to be more effective than classroom-only instruction. Self-study, online or distance instruction and advanced visual technologies (e.g. virtual or augmented reality, second life, etc.) are not effective for entry-level skills training. For similar workforce development projects, training is **free for participants**, with the exception of testing fees. Other considerations include training *program articulation* to other certifications, diplomas, apprenticeship programs and degrees which is often a criteria for financial aid.

Instructors

Instructors specializing in vocational and technical education and training are readily available at several area vocational trade schools, community colleges, union apprenticeship training centers. Instructors from community service organizations may be most effective for on-site training at correctional or detention facilities. NCCER and (or) OSHA 30 *accredited training providers* in Milwaukee include:

- Milwaukee Area Technical College
- Mindful Staffing Solutions, LLC²
- Duran Skills & Trades
- Milwaukee Job Corps Center
- Social Development Commission of Milwaukee
- Findley Foundation, Inc.
- Milwaukee Community Service Corps

² <https://www.mindfulstaff.com/buildingtrades>

Facilities and Equipment

Facility and equipment resources are available at several area training partner sites. Corrections facilities may also provide instructional space for incarcerated participants who are not-eligible for work release. Often, employers and industry organizations donate equipment and other forms of in-kind support to training providers. For this project, a dedicated production facility should be considered to provide participants OJT and post-completion employment opportunities. Such a manufacturing facility, operated by an industry partner, may train and employ program participants in exchange for the purchasing of offsite construction products for area public housing projects. In such a scenario, start-up facilities and equipment should be sufficient to produce two-dimensional (2D) wall and floor panels. Panelized components are simple to prefabricate and require less capital intensive equipment. As the training program develops, the manufacturing facility may scale up to produce more complete three-dimensional (3D) building modules.

Recruitment and Retention

Participants will initially include 30 men of color and will likely include those having risk factors that could lead to incarceration or recidivism. In order to build interest and engage participants from this demographic, the training program should:

- Be free
- Qualify for financial assistance and transitional housing
- Lead to a job

For similar workforce development projects, engaging incarcerated populations was a very effective method of recruiting and retaining participants. Incarcerated participants often had an incentive to obtain employment upon their release, due to transitional housing or probation requirements. Without competing life issues, participants in work release programs and soon-to-be released offenders (<90 day) had the highest rates of program completion and were prepared for jobs upon their release.

Participants from this non-traditional demographic, however, must be engaged in non-traditional ways. Promotional materials such as brochures and traditional marketing materials are not effective. The most effective recruitment method is through word of mouth from current or past program participants.

Participant Assessment

In addition to establishing criteria for participant qualification and selection, consideration should be given to assessing prior work experience and 'soft skills'. The assessment should include participant motivation and interest in the program, communication skills and career awareness. The assessment plan should define *what* tools and processes will be used, *who* will conduct the assessment, and *how* the assessment results will be used to determine the appropriate training placement for participants.

Intrusive Coaching

Intrusive or 'preemptive' coaching is an effective strategy where participant mentors anticipate challenges to successful training completion and, proactively address those challenges together with the participant. Challenges can be both training related or life issues, particularly for those reentering society. Intrusive coaching goes beyond traditional academic counseling and job placement. Coaches or "guides-on-the-side" provide connections for financial assistance and social support. For similar workforce development projects, enhanced coaching and student-employer mentorship was the most effective method to improve training effectiveness and program retention.

Job Placement

For similar workforce development projects, lack of employer engagement was often the greatest barrier to success. Rarely do job placement commitments at the beginning of the project materialize at the end. To overcome this challenge, some participants may be placed into employment at a program-sponsored production facility. Other participants may transition to employment opportunities in construction or manufacturing. The program should utilize existing employment assistance resources wherever possible to include both government and non-profit labor organizations such as *Employ Milwaukee*³. Such organizations not only connect participants to employment opportunities but can also assist in recruiting, providing training and attracting program investment.

Program Management

For similar workforce development projects, the sponsor or their designee provides *program management*. Management responsibilities typically include the coordination of project partners and activities, administration of project funds and project reporting.

Staffing

Staffing requirements for a start-up program may require part-time oversight from a program manager or director and, an administrative assistant with training in data management and program finance. Start-up activities may include the establishment of an advisory committee of stakeholders and the management of partner agreements and contracts necessary to achieve program goals and objectives.

Outcome Assessment

For similar workforce development projects, outcome assessments were necessary to demonstrate the success of the program. Outcome assessments maintain record of credential completion and employment and may include:

- Participant ID and demographic information
- Participants in training
- Participants completing training
- Participants earning credentials
- Participants enrolled in other education or training programs
- Participants employed after completing training
- Participants retained in employment (6-12 months)
- Participant wage information

Participant *intake and tracking* data should maintain participant confidentiality. Personally identifiable information (PII) or data that can be used to identify a specific participant such as a social security number, mailing or email address, and phone number should be secured by a qualified data management specialist.

Funding and Sustainability

For similar projects, funding is usually obtained in the form of a large, multi-year grant from a federal, state or philanthropic organization. Unfortunately, most of these projects are not sustained when these grants end. For this project, opportunities exist to leverage resources from existing training partners, employers, industry groups and workforce systems to reduce start-up costs. Perhaps most promising is the potential for this project to generate its own employment opportunities and revenue to sustain, enhance and expand program capacity.

³ <https://www.employmilwaukee.org>

The average cost for each 9-week training and certification level is approximately \$4,850 per participant including all training materials, personal protective equipment (PPE) and hand tools. For an initial training cohort of 30 persons, the cost is approximately \$150,000. Volume discounts and exclusions (e.g. tools) may reduce this cost significantly. Additionally, if a program-sponsored training and production facility is considered, such a facility may have the following *fixed costs*:

Facility lease:	\$0.50/sf/month x 50,000sf	= \$ 300,000/yr.
Facility O&M:	\$0.30/sf/month x 50,000sf	= \$ 180,000/yr.
Equipment lease:	\$0.20/sf/month x 50,000sf	= \$ 120,000/yr.
Permanent Staff:	4ea x \$75,000 incl. fringe	= \$ 300,000/yr.
Misc:		= \$ <u>100,000/yr.</u>
		= \$1,000,000/yr.

If *variable costs* associated with production (e.g. materials, labor, variable overheads, etc.) are 80% of output, then approximately \$5M/year in production output will be required to pay for fixed facility costs. If wall and floor framing components comprise approximately 10% of a new public housing unit costing \$100/sf, then panelized components for 500 units (1,000/sf each) would be required each year for the facility to remain cost neutral (e.g. 'breakeven'). Public housing units using prefabricated wall and floor panels, however, may reduce construction costs 5%-7% per unit for a cost savings of \$2.5-\$3.5M for 500 public housing units. A small share of this sponsor savings could fund both the training program and production facility. Additionally, the proposed project could be used to leverage funding from other federal and state workforce investment grant programs.



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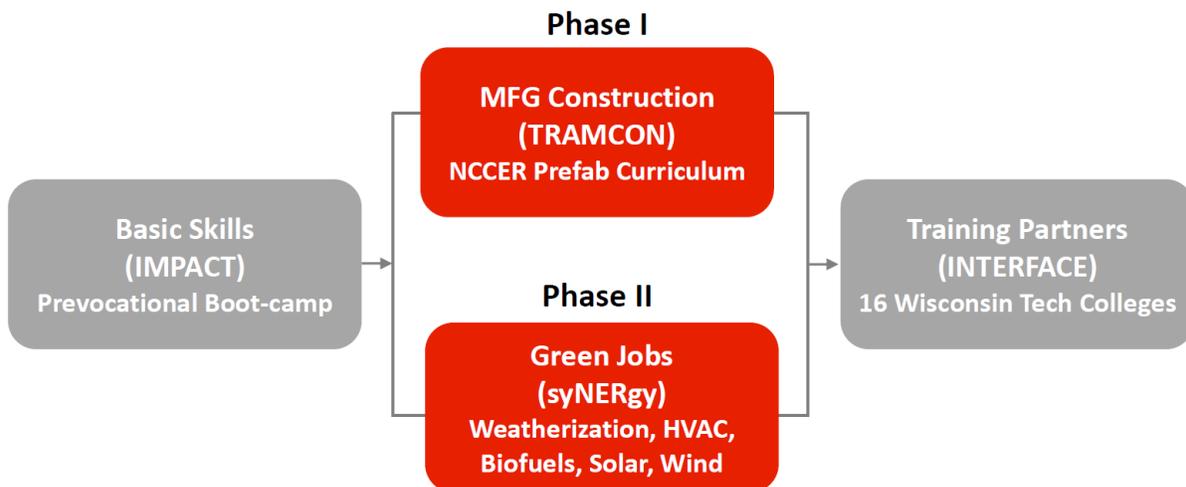
Summary of Successful Workforce Development Programs

BBWA Program
Technical Assistance for the City of Milwaukee

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Proposed Program Model



Existing Programs

- TRAMCON (Florida)
 - USDOL TAA – 2014-2017 (\$10M)
 - **Manufactured Construction**
 - Community College Consortium – Miami-Dade College (lead)
 - 3,090 participants / 3,800 earned credentials
- Entry level skills in basic carpentry, electrical, HVAC, plumbing and production

Existing Programs

- TRAMCON (Florida)
 - Participants
 - Male (84%), HS, GED or less (46%), Age (37), Non-white (56%)
 - Training
 - Foundation – OSHA 10/30 and NCCER Core (4-6 weeks)
 - Basic – NCCER MFG Construction I (9 weeks + 500hrs OJT)
 - Advanced - NCCER MFG Construction II (12 weeks + 1000hrs OJT)
 - Supervisor – NCCER PM, Sustainable Construction
- Nationally recognized, industry transferable credentials
- Articulates toward certificate, diploma or 2-year degree
- Uses existing, proven curriculum

Existing Programs

- TRAMCON (Florida)
 - Instruction
 - Leveraged existing training partner instructors, classrooms, labs
 - Traditional (day), night and 'boot camp' delivery
 - 'Hands-on' instruction, work teams, relationship building
 - Some distance, self-study (not effective)
 - Technology enabled, AR/VR instruction (not effective)
- 3 of 4 colleges served incarcerated populations at correctional facilities or work release

Existing Programs

- IMPACT (Nebraska)
 - USDOL TAA – 2012-2015 (\$6M)
 - Advanced Manufacturing
 - Community College Consortium – Central Community College (lead)
 - 1,020 participants / 713 earned credentials
- Basic, intermediate and advanced skills in production, maintenance and quality control
- Adult basic education (math, reading, communications, etc.) *together* with occupational skills training – 126 foundational exercises

Existing Programs

- IMPACT (Nebraska)
 - Participants
 - Male (93%), Age (26), Underrepresented (38%)
 - Training
 - Blended learning (classroom, lab, online)
 - SME Tooling U – 82 modules, Learning Management System
 - MSSC Safety, Production, Maintenance and Quality Control
- Nationally recognized, industry transferable credentials (CMfgT, NIMS, AWS)
- Articulates toward certificate, diploma or 2-year degree
- Uses existing, proven curriculum

Existing Programs

- syNErgy (Nebraska)
 - USDOL SESP – 2009-2012 (\$5M)
 - Green Jobs (energy efficiency, renewable energy)
 - K-12/ESU, higher ed, vocational, apprenticeships, NGOs – NE Department of Labor (lead)
 - 1,313 participants / 421 earned credentials
- Building Analyst I (BPI-residential), BA II (commercial), 'Small' Wind and Farm Analyst I
- Prevocational ABE boot camp (2-week, 80-hour)

Existing Programs

- INTERFACE (Wisconsin)
 - USDOL TAA – 2013-2016 (\$10M)
 - Information Technology
 - Community College Consortium – Northcentral Technical College (lead)
 - 4,962 participants
- UW-Stout and 16 Wisconsin Technical College System (WTCS) colleges

Existing Programs (all)

- Stakeholders
 - Training providers
 - Employers
 - Workforce systems
 - NGOs
- Stakeholder advisory or oversight committee
- Incentives that maximize stakeholder involvement and performance
- Employer commitments

Existing Programs (all)

- Staffing
 - Program manager
 - Recruitment/completion coaches
 - Job placement specialists
 - Data/finance specialists
 - Instructors
- Intrusive coaching vs. career counseling
- Leverage existing partner resources

Existing Programs (all)

- Recruitment, Retention and Job Placement
 - Target participant(s)
 - Effective participant engagement
 - Selection and assessment processes and tools
 - Participant intake and tracking; metrics
 - Employment and wage data sources
- Word of mouth, former students (traditional marketing ineffective)

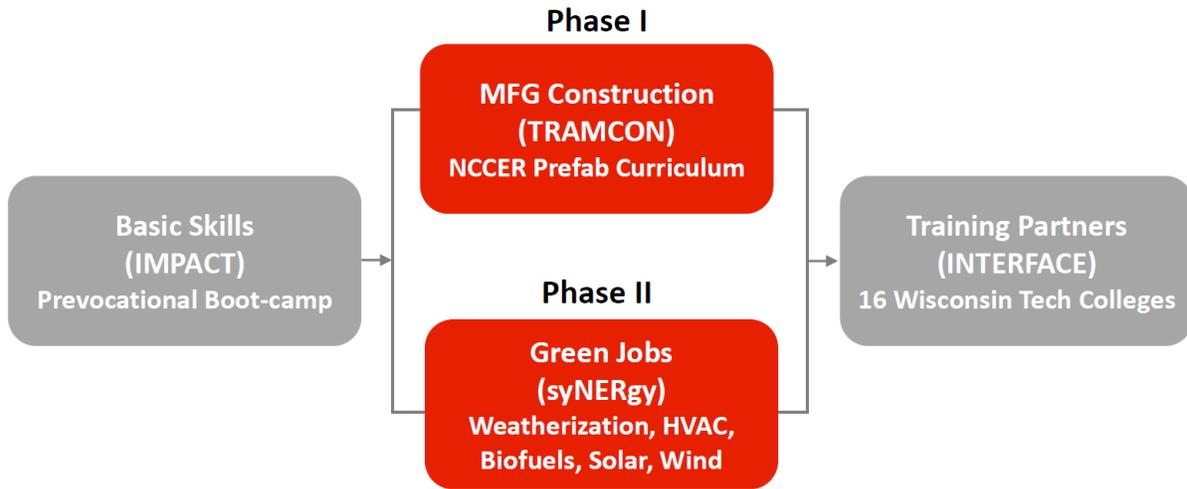
Existing Programs (all)

- Participant Support Services
 - Financial assistance
 - Transitional housing
 - Probation requirements
- Both academic and 'life' issues support

Existing Programs (all)

- Program growth and sustainability
 - Phased approach
- Barriers
 - Employer commitments seldom materialize
 - Participants lack basic math and work readiness skills
 - Effective recruitment for new programs is difficult
 - Participant expenses (certifications, textbooks, etc.)
 - 'Free' programs are often disincentive for engagement (e.g. 'skin in the game')

Proposed Program Model



Next Steps

- Work plan
 - Detailed project plan and roadmap
 - Project partners, staffing and funding requirements
 - Recruitment, training, support services and job placement
 - Project growth and sustainability

