ICC 825: Private Sewage Disposal System Standards

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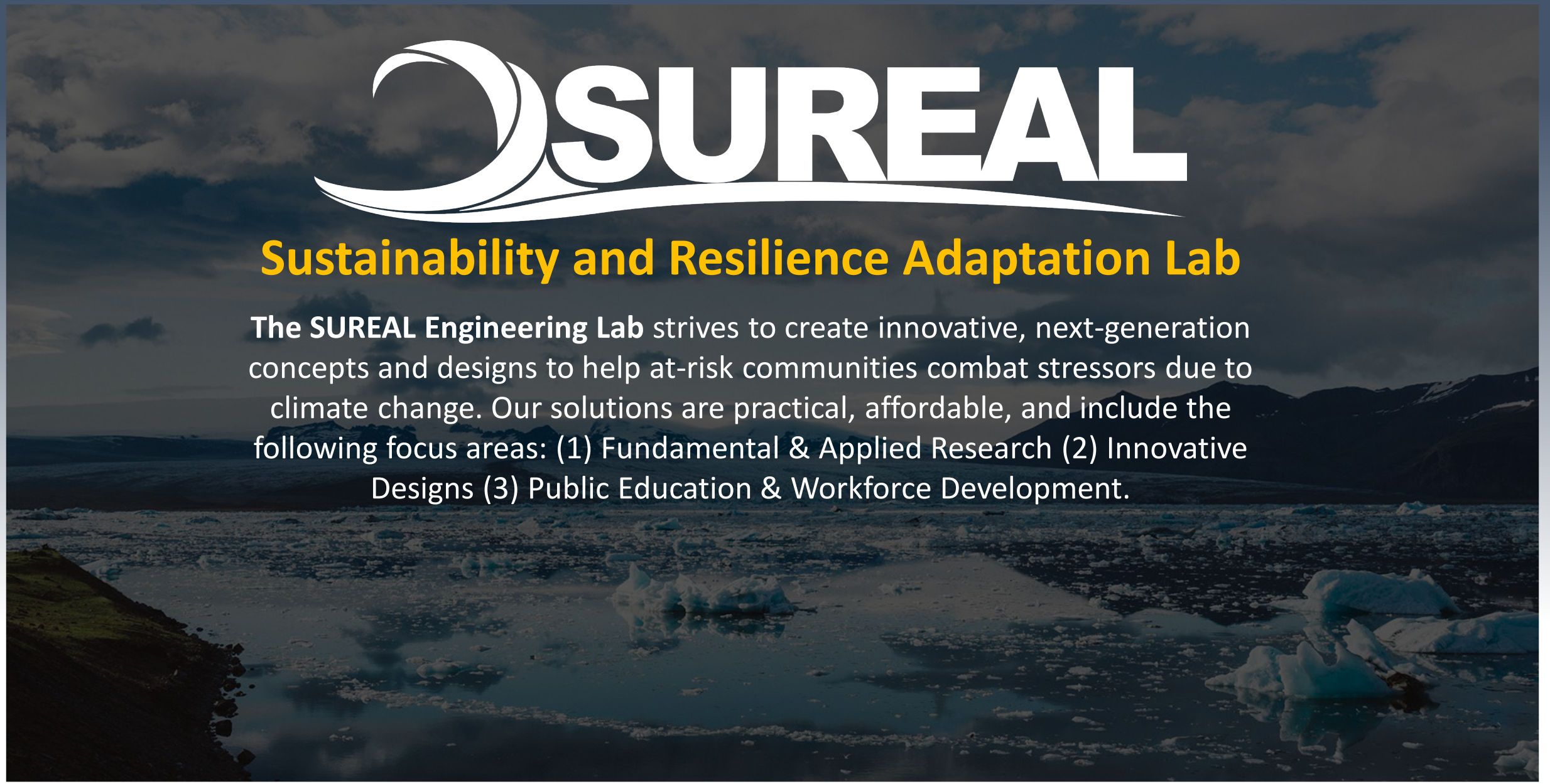

SUREAL
Sustainability and Resilience Adaptation Lab
The SUREAL Engineering Lab strives to create innovative, next-generation concepts and designs to help at-risk communities combat stressors due to climate change. Our solutions are practical, affordable, and include the following focus areas: (1) Fundamental & Applied Research (2) Innovative Designs (3) Public Education & Workforce Development.

The International Code Council is currently seeking contractors, engineers, code officials, academics, manufacturers, health authority experts, and other industry stakeholders to help develop the following standards:

- **ICC 815 - Sizing Water Distribution, Drainage and Venting Standard** This new international standard will take a holistic worldwide approach to sizing water distribution, sanitary drainage, and vent piping systems for residential, mixed-use, and institutional occupancies that utilizes a modern sizing method that will greatly improve upon outdated methods currently used in all plumbing codes, as well as account for post-COVID-19 usage patterns.
- **ICC 825 - Private Sewage Disposal Systems Standard** This new international standard will provide minimum requirements for designing, constructing, operating, and maintaining private sewage disposals systems based on newer technologies and methods, and most importantly, the impacts of climate change.

To learn more about these standards committees visit www.iccsafe.org/membership/councils-committees/call-for-councils-and-committees/.

Why is a Standard Needed?

2023+

The new international standard will provide minimum requirements for designing, constructing, operating, and maintaining private sewage disposal systems based on newer technologies and methods, and most importantly, the impacts of climate change.

Several current standards…

Standards exist for the proper evaluation of onsite wastewater treatment systems.

Meeting these standards demonstrates compliance and strict measures of performance.

Examples of existing standards that have emerged from our literature review so far…

NSF/ANSI Standards 350 ; 350-1

NSF/ANSI 40

NSF/ANSI Standard 41

NSF/ANSI 46

NSF/ANSI 245

NSF/ANSI 240

NSF/ANSI 360

ICC ; IPSDC

Protocol P150

NSF P157

NSF P353

ASTM

CISPI

AS/NZS 1546

Johkasou Act

There are more…

Current Guidance

- Standards
- Codes

Climate Change

- Vulnerabilities
- Geographic Variation

Technology & Innovations

- Water Reuse?
- Research
- New Systems

- Identify current standards that can be improved upon accounting for projected climate change impacts.

- Identify new technologies and innovations that provide pathways to mitigating future projected climate impacts.

- With provided solutions, write a baseline standard that can apply anywhere – on some basic level.

- Create subcategories for types of solutions and develop necessary standards for those.

Phase I

Literature Review:
1) In Place WW Systems
2) Climate Change Vulnerabilities
3) New and Emerging Technologies

Phase II

Research Items Compiled

Match Problems w/ Appropriate Solutions

PHASE I: LITERATURE REVIEW

In order to compile an accurate assessment of the types of on-site treatment and disposal + reuse/reclamation systems, an in-depth review of **state standards** (USA), **international standards**, **societal standards** (clusters/regions), **environmental projections**, and **economic constraints** will need to be detailed as completely as possible.

University of Miami:

- **Review** of policies, planning and management considerations, types of reuse applications, state regulatory programs, regional variations in reclamation/reuse, and treatment technologies for public and environmental health. States/Countries with particularly complete/stringent standards will be highlighted as anchors and a foundation to build upon.

- **Create** a holistic understanding of how various global communities understand and interact with wastewater, water reuse, and reclamation provides insight into what systems, training, maintenance, and operations will be favored in certain areas over others. Various regions lack any sort of on-site treatments, baseline standards won't be generated from these areas, but rather, sub-standards to respond to their needs can be.

- **Project** climate change impacts requires selecting specific models to forecast impacts to varying hazards. Regions with multiple hazards will require a prioritization of threat responses as one hazard may require a drastically different strategy than another. Ex: Arid areas that prioritize the conservation of water v. tropical areas that may deal with flash flooding, high water tables, etc.

- **Project** adoption rates when standards are developed; identifying and capturing the immediate and long-term adoption capacity will inform how impactful new standards are.

- **Investigate** novel solutions, technological advancements, natural – hybrid - mechanical, physical – biological – chemical filtration, modular, etc. (Sub-standards)

Phase I

Ongoing Research (Lit. Review)

- Current onsite treatment and disposal systems and associated policies at the macro (global/regional) scale.
- Mapping the OSTD systems to appropriate geographical regions (clusters). Infiltration/Discharge
- Review newly emerging technologies in OSTD systems.
- Identify vulnerabilities of in-use systems to CC.
- Repeat steps 1-3 for water reuse or reclamation (Scope).

Technical Committee Role

- **SCOPE** of review.
- Review and inform team of common international **systems, strategies,** and in clustered regions.
- Review emerging technologies.
- Review and inform climate change models for OSWT.
- Review and inform capacity considerations – current and projected.

PHASE II:
Defining Vulnerabilities and Developing Responses to Phase I

- Need to understand common practices outside of US
- Financial limitations
- **Inadequate regulatory framework and enforcement of existing legislation**
- Limited local design, technical and operational capacity

Phase II

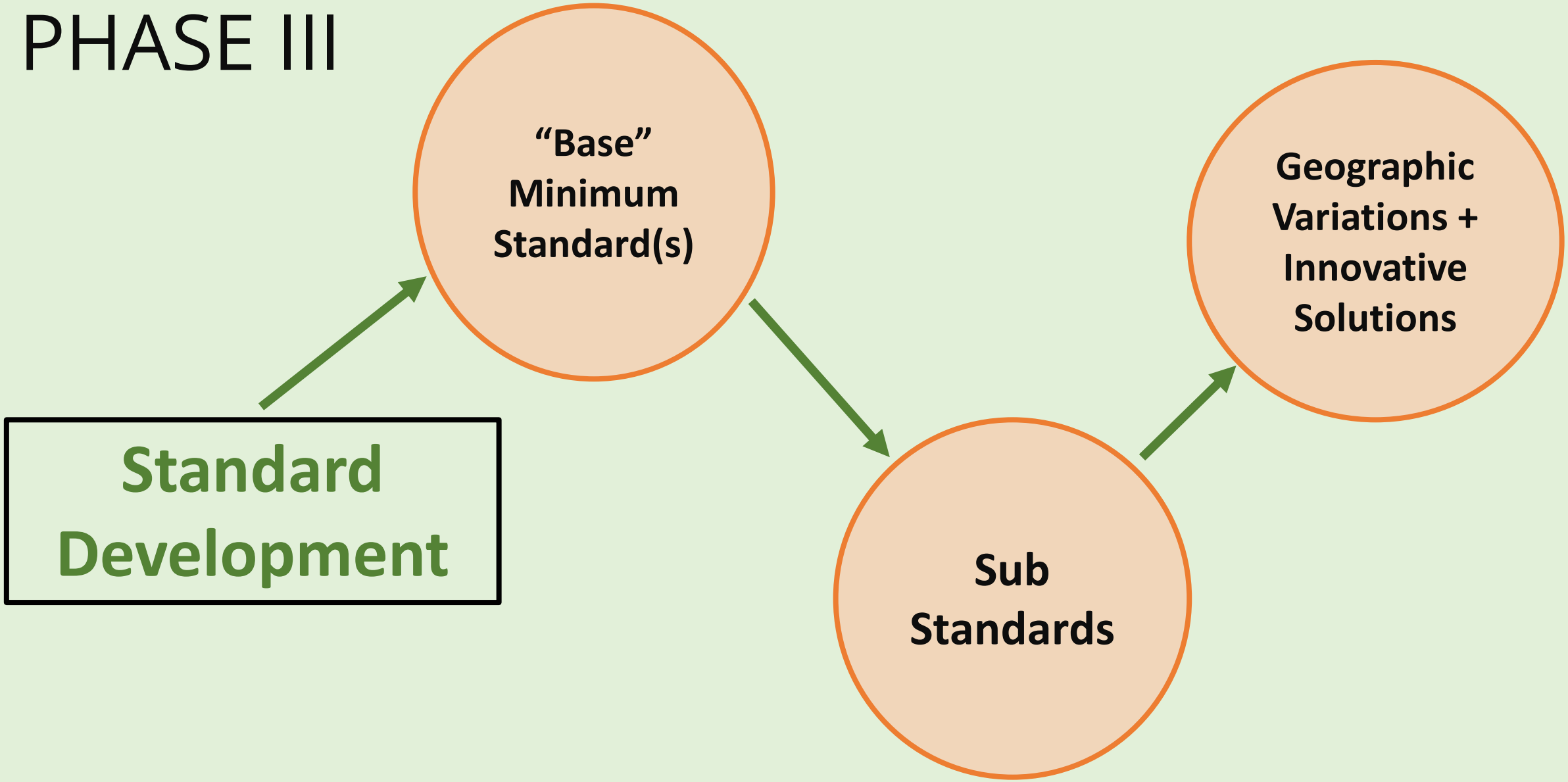
Vulnerabilities and Responses

- Vulnerabilities of currently in-use systems based on regionally specific CC impacts.
- Prescriptive recommendations for OSTD and water reuse/reclamation to include emerging technologies and novel approaches.

Technical Committee Role

- Advise on climate change models, projected impacts, and prescribed mitigation/adaptation strategies.
- Review and contribute to emerging technologies:
  - **Strategies/Systems/Methods**
  - Mechanical/Natural/Hybrid Systems
  - Filtration Methods
  - Remediation Methods

PHASE III


"Base" Minimum Standard(s)
Geographic Variations + Innovative Solutions
Standard Development
Sub Standards

ARRANGEMENT AND FORMAT OF THE 2021 IPSDC

The format of the IPSDC allows each chapter to be devoted to a particular subject with the exception of Chapter 3, which contains general subject matters that are not extensive enough to warrant their own independent chapter.

The following table shows how the IPSDC is divided. The ensuing chapter-by-chapter synopsis details the scope and intent of the provisions of the IPSDC.

CHAPTER TOPICS	
Chapter	**Topic**
1	Scope and Administration
2	Definitions
3	General Regulations
4	Site Evaluation and Requirements
5	Materials
6	Soil Absorption Systems
7	Pressure Distribution Systems
8	Tanks
9	Mound Systems
10	Cesspools
11	Residential Wastewater Systems
12	Inspections
13	Nonliquid Saturated Treatment Systems
14	Referenced Standards
Appendix A	System Layout Illustrations
Appendix B	Pressure Distribution Systems
Appendix C	Board of Appeals

Phase III

Standard Development

- Develop next generation OSTD and reclaim/reuse systems baseline standards (ICC 825).
- Geographic variations, innovative solutions, emerging technologies incorporated.
- Development of sub-standards as living documents
- Standards update as climate models account for new environmental inputs.

Technical Committee Role

- Develop technical language to be incorporated into the standard.
- Advise on sub-standards – to include any novel OSWT methods.
- Updated climate data can shift environmental projections and impact standards in certain cases.
- Developing a living document that regularly incorporates climate data to ensure best practices are maintained.

Research Informed Standard Development

CC Projections

- Increased Precipitation
- Droughts
- Rising Sea Levels
- Temperature Changes
- Extreme Weather Events

CC Future Needs

- System designs that can handle large volumes of water and more resistant to flooding.
- Systems that require water to operate may operate less effectively in arid regions.
- SLR in low lying regions risks contamination and can require relocation or elevated solutions.
- Biological systems can be impacted by changing temperatures – if temperatures change significantly, measures should be taken to adapt/retrofit these systems.
- Storms, floods, fires, *etc*., can impact/destroy OSWT infrastructure. Standards for addressing these threats at micro/macro levels should be developed.

Living Document: Dynamically Adaptive Standards

- What this work produces should be a **living standard** - dynamically adaptive.
- Do NOT want this to become obsolete 10-20 years down the road because of poorly constructed climate projections.
- Technological **innovations** and improved climate change **projections** may trigger a review of ICC 825 to determine if revisions are needed.

Technical Committee:
Pursuit of new knowledge and applied research

Current Standards (example)	Updated Standards (example)
A: XXX: Standard for residential wastewater treatment systems	A: New standard with local/regional **climate projections** incorporated into **threat assessments** and **design & construction** of new/retrofitted systems.
B: XXX: Evaluation of the performance of wastewater treatment system components and devices such as grinder pumps, septic tank effluent filters, chlorination devices and UV disinfection devices	B: Identify new technologies that aid in wastewater treatment, disposal, and reuse in the targeted locations. Evaluation of **natural and mechanical solutions** to meet the needed standards for wastewater treatment.

Phase IV

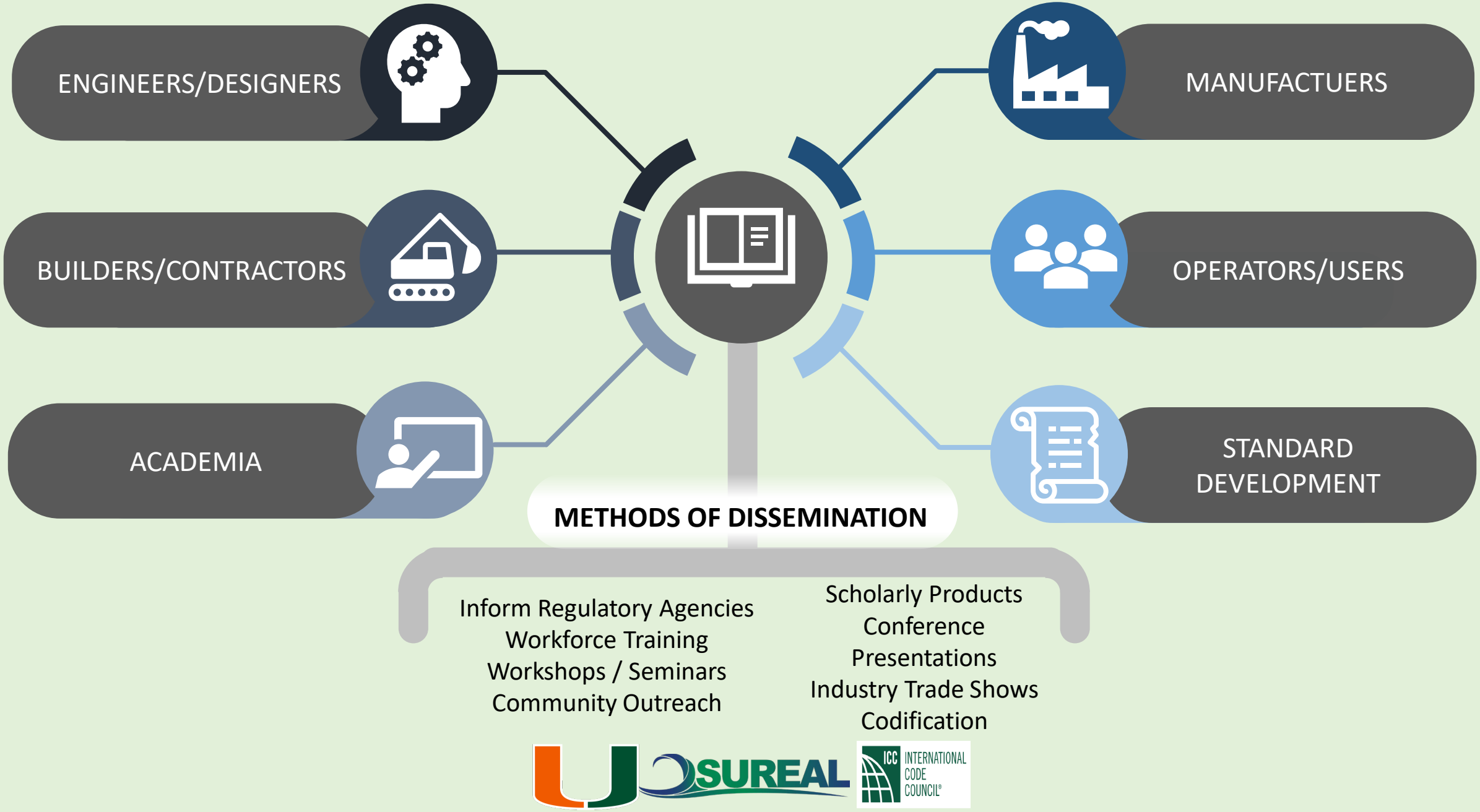
Formalization

- Once ICC 825 is developed, research and tools associated with the development of the standard may be provided to stakeholders (regulatory agencies, private industry, workforce development, community leadership, *etc*.) through a series of presentations, workshops, and academic papers.

Stakeholder Feedback

- Stakeholder
- Reference Documents
- XXX
- XXX

PHASE IV: DISSEMINATION



Questions

Notes