

Hydrogen Codes and Standards A Fire Marshal Perspective

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F P 2 F I R E, I N C.

Fire Marshal's Duty

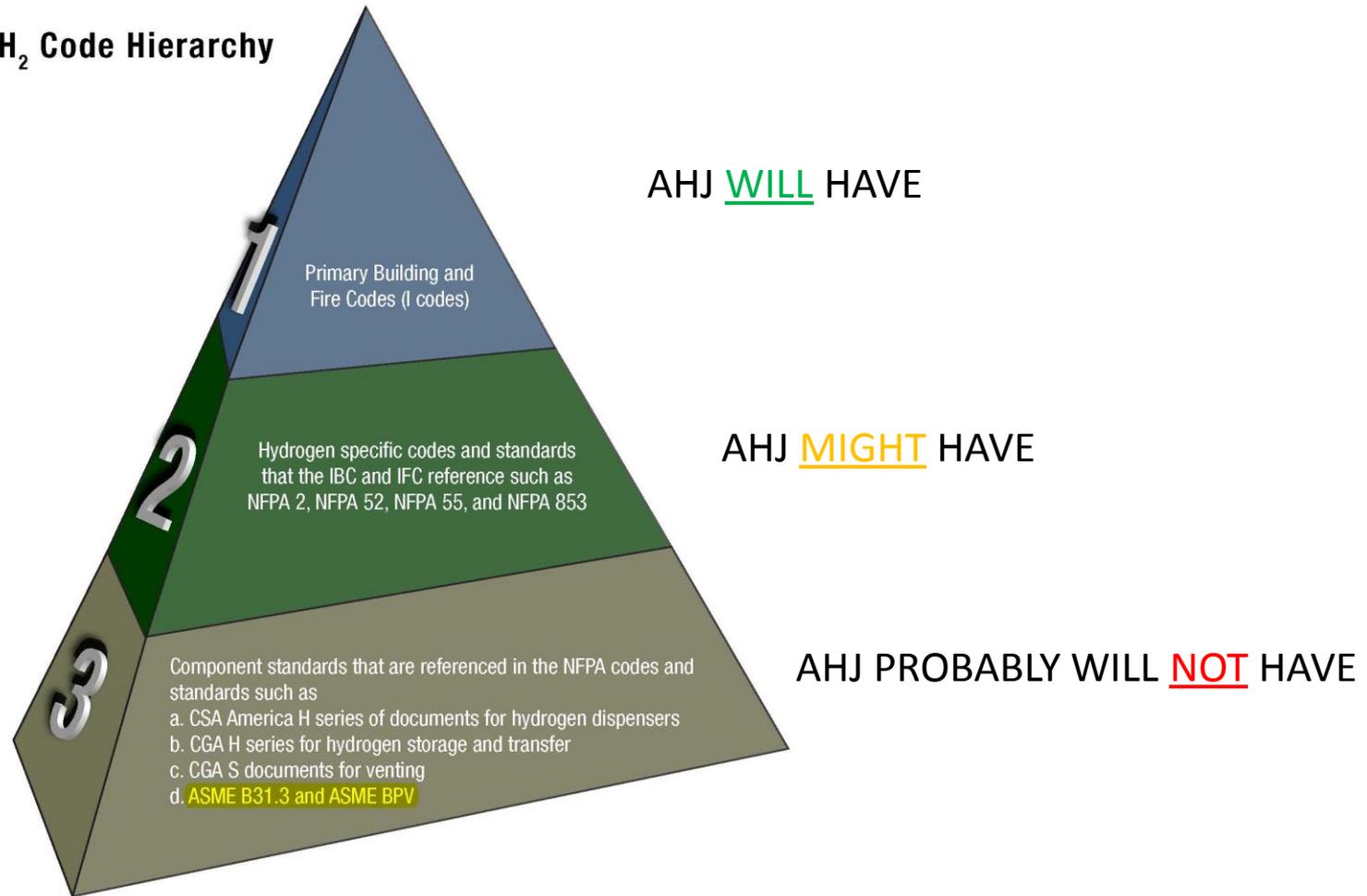
- Public Safety through Code Compliance
- Plan Review
 - Review & Approve
 - New Construction
 - Modifications
- End Result
 - Construction Permit
 - Construction Process
 - Inspection Process
 - Commissioning Process
 - Operational Permit (i.e. – Hazardous Materials)

Code Adoption

- Code Must be adopted Locally to be enforceable.
- Jurisdictions Vary Geographically
 - State
 - County
 - City
 - District
 - Federal

The Code Pyramid

H₂ Code Hierarchy

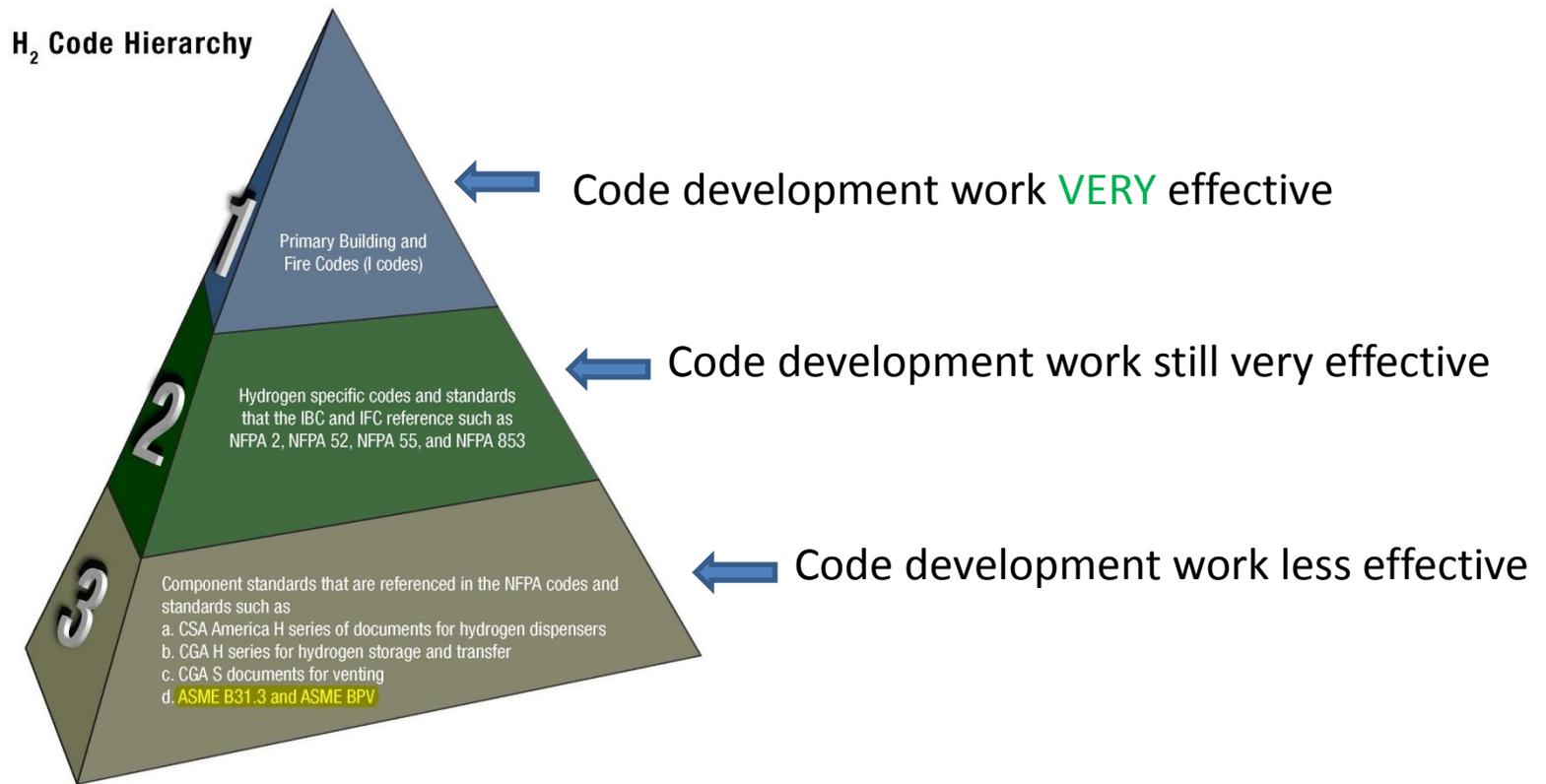


Local Codes

- Most Jurisdictions Adopt
 - Fire Code (two common models)
 - IFC (vast majority of jurisdictions)
 - NFPA 1 (some jurisdictions)
- Local Law or Ordinance
 - Adopted Model Codes + local amendments become law and legally enforceable
- Few jurisdictions go any further

Relevance to Hydrogen?

– Top Level Code Development Work has greater impact



Fire Marshal Work Load

- Responsible for ALL of The Built Environment
 - All fire alarm / detection systems
 - All sprinkler /standpipe systems
 - All special suppression
 - Fire Department Access
 - All high rise
 - Offices
 - Residences
 - Warehouses
 - Industries
 - Hazardous Materials
 - Fire Investigation
 - Public Education
 - hydrogen

Municipal Budgets

- Static or Decreasing
- Result for Hydrogen Refueling Installations
- Limited resources
- Extra time spent learning may be at the expense of other (more important projects)
- Reviews may get handed off to 3rd party consultants at Applicant Expense

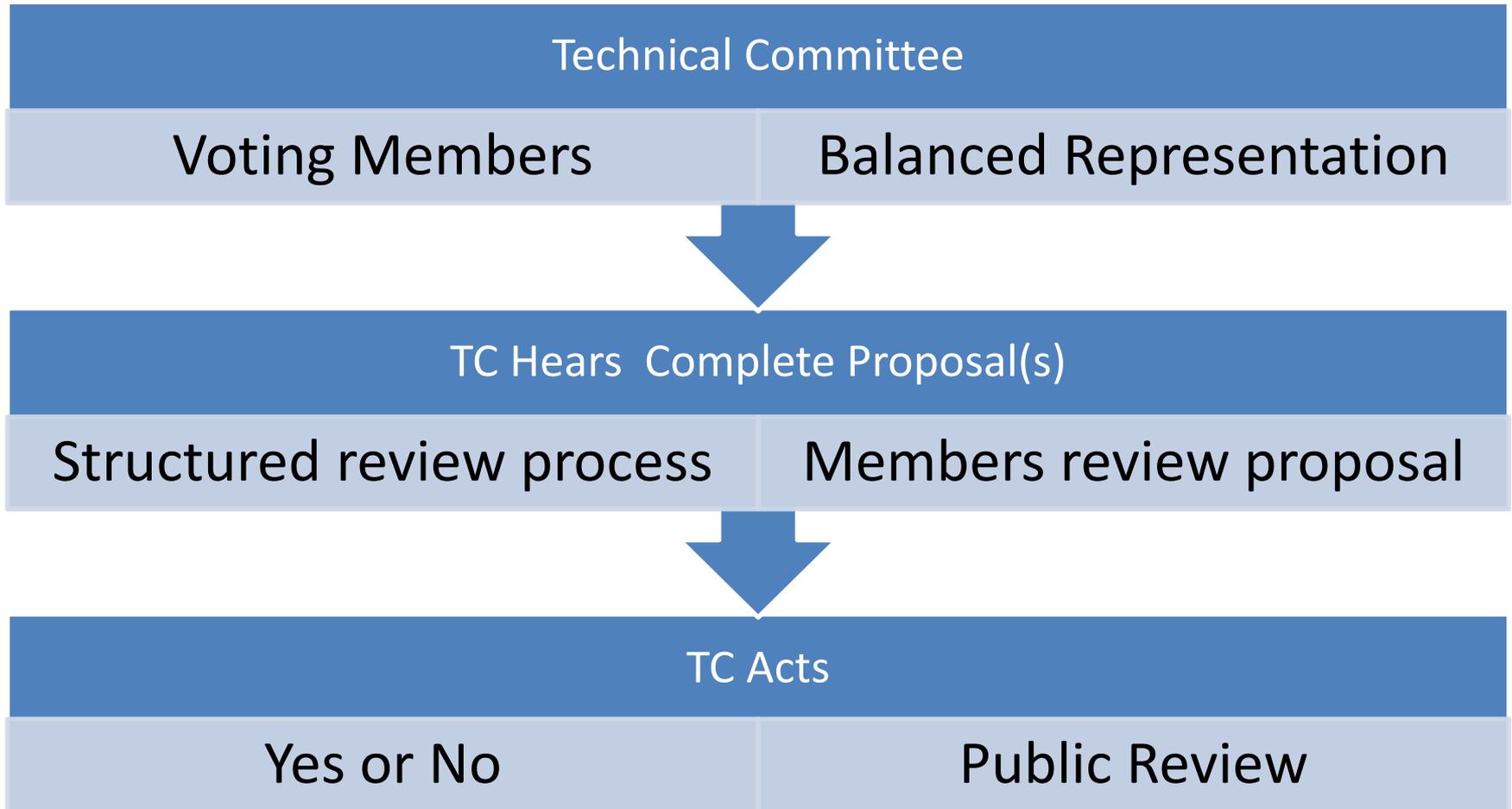
How to Help?

- Make Plan Review Easier
 - Prescriptive Code Requirements: YES
 - Difficult to develop
 - Easy to enforce
 - Performance Based Requirements: NO
 - Easy to develop
 - Hard to enforce
 - Continue support of Key (Level 2) NFPA Documents
 - NFPA 2, NFPA 55, NFPA 400, NFPA 853
 - Support efforts to add References to Key (Level 2) documents in the Level 1 Codes (IFC, NFPA 1)

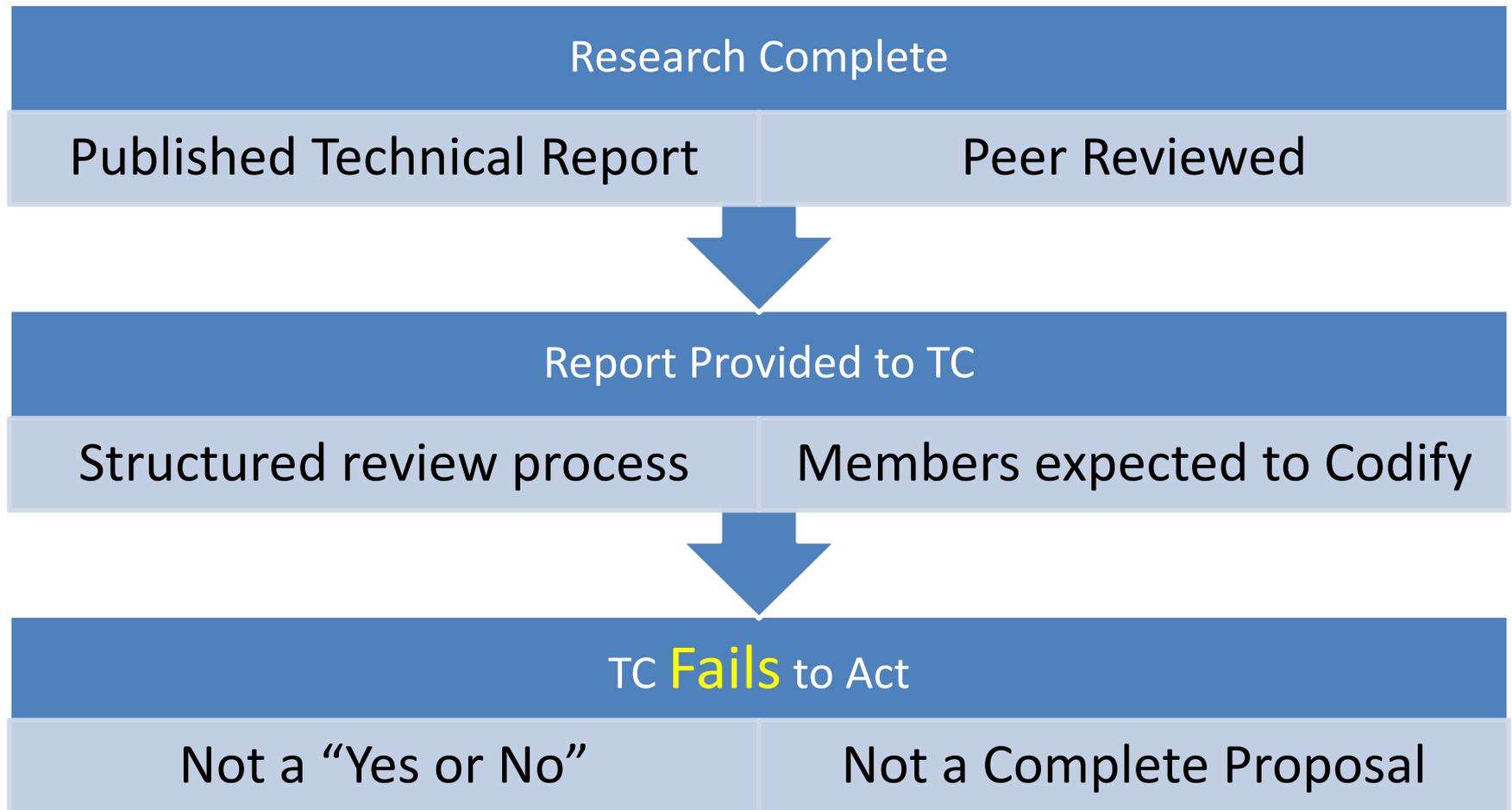
Improve Code Harmonization

- NFPA 55
 - Correlation of thresholds: MAQ, Bulk
- NFPA 2
 - Templated structure approach big step
 - Need Laboratory Specific requirements (R&D)
 - Need H2 specific de-minimus thresholds
 - Need H2 specific hydrogen content
 - Codify research results
 - The research is half the job.
 - Codification is the other half.
 - Explore development of NFPA 2 Handbook

Code Development Process



Ineffective Code Development



Develop Complete Proposals

- Research focused to specific code issue
- Develop complete proposal
 - Research as justification
- Engage TC at correct time
- Solicit assistance and guidance from TC
 - Not mandatory
 - Can be effective
 - Runs at the pace of volunteers

Technical Assistance for Fire Marshals

- Create independent technical review capability
 - Code experts
 - Hydrogen experts
 - Independent expertise
 - Funded through neutral entity
 - Available to Fire Marshals at no cost
 - Perform bulk of Plan Review process
 - Available for Inspection/Commissioning

Conclusion

- Important to Understand
 - Code Pyramid
 - Local Adoption Process
 - Local Amendment Process
- Improvements to a Small Quantity of Documents have the most impact (Level 1 & 2)
- Fire Marshals need less work not more
- Technical plan review assistance will help.

Questions?



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