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HySCAN

BETA-RELEASE OF HYDROGEN SAFETY CODES AND STANDARDS APPLICABILITY NAVIGATOR (HYSCAN) INFORMATIONAL TOOL

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Sandia National Laboratories

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Pacific Northwest
NATIONAL LABORATORY

U.S. DEPARTMENT OF ENERGY | NNSA National Nuclear Security Administration

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INTRODUCTION

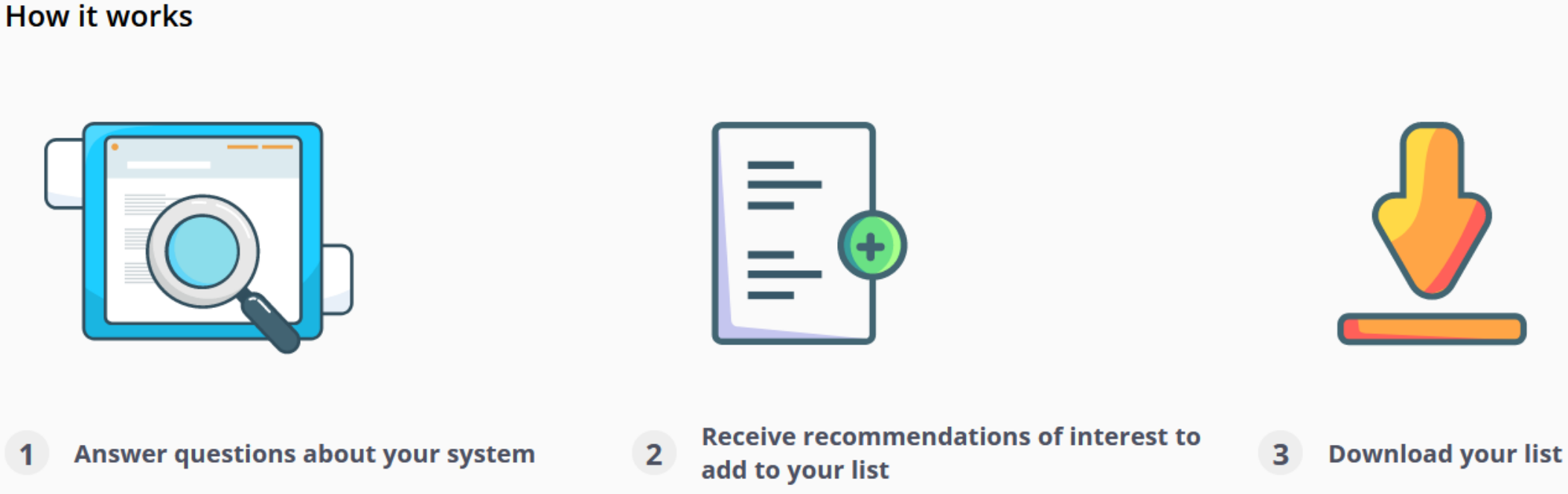
- **Background:** Expanding interest in hydrogen production, storage, and use leading to many new entrants to the hydrogen industry
  - Some new entrants not familiar with existing codes and standards
  - New uses can lead to new requirements even for existing industry participants

- **Vision**: Enable new hydrogen stakeholders to identify what codes and standards currently exist and may apply to their system

- **Multi-lab team**:
  - **NREL** & **Sandia**: Identify codes and standards that apply to different components and develop applicability questions for them
  - **PNNL**: Implement online tool and host on https://h2tools.org/hyscan/

PROCESS

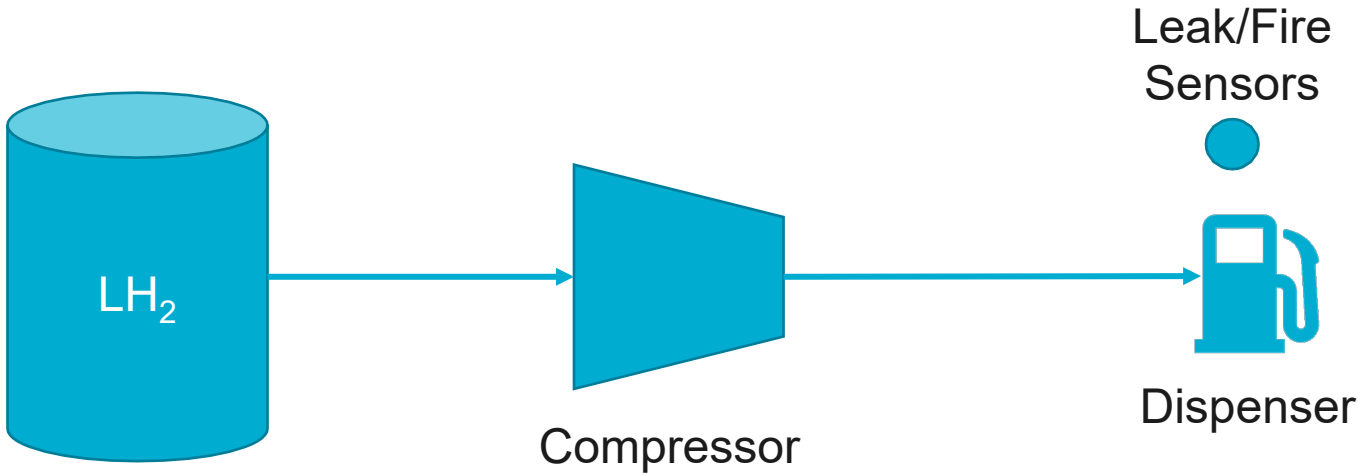
1. Select components
   - For system of interest
2. Enter component details
   - Answer yes/no-type questions about components
3. Review suggested codes and standards



EXAMPLE 1: HYDROGEN VEHICLE REFUELING STATION

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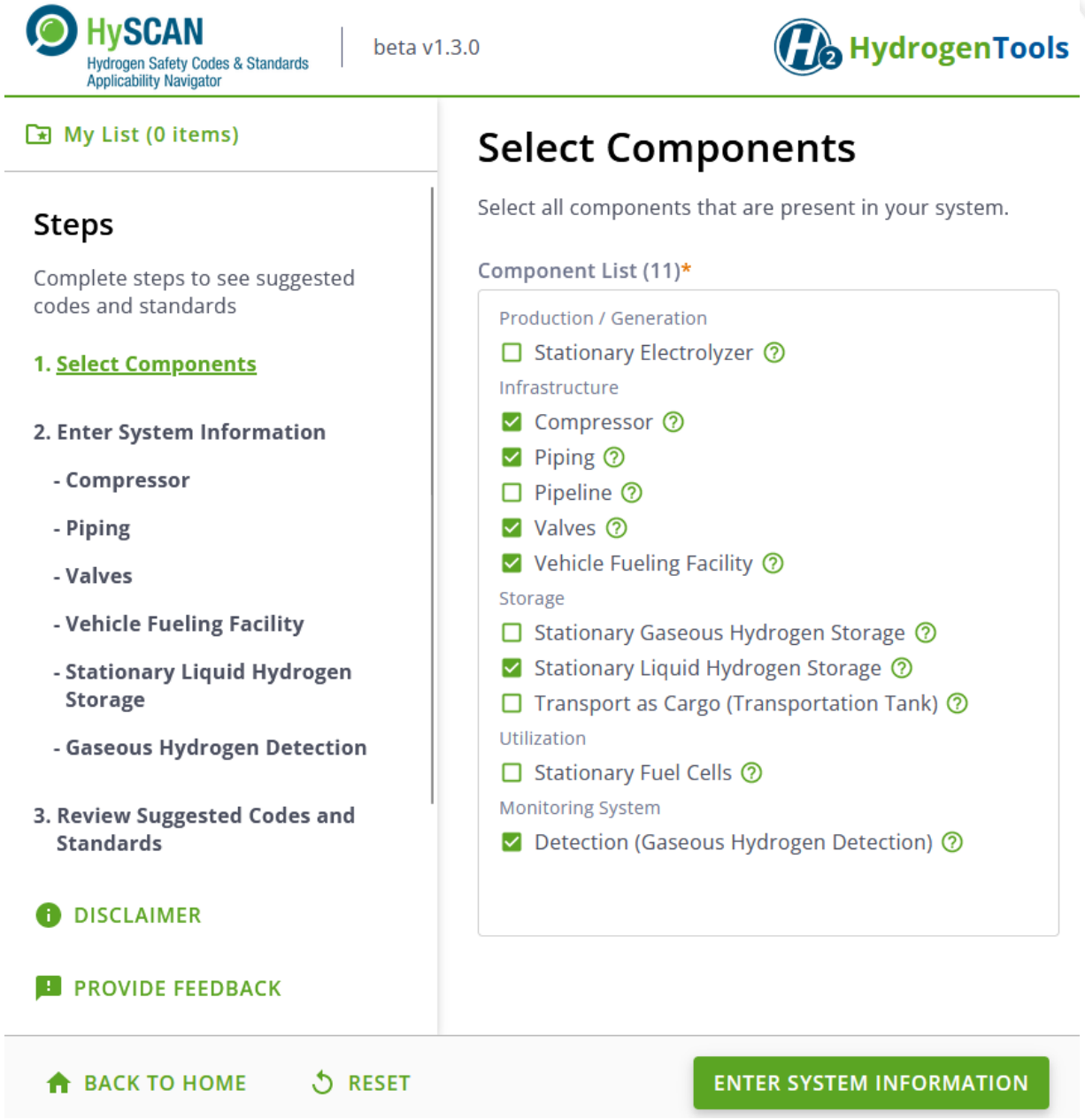
- On-site liquid hydrogen storage tank
- Dispensing 700 bar gaseous hydrogen



EXAMPLE 1 COMPONENTS

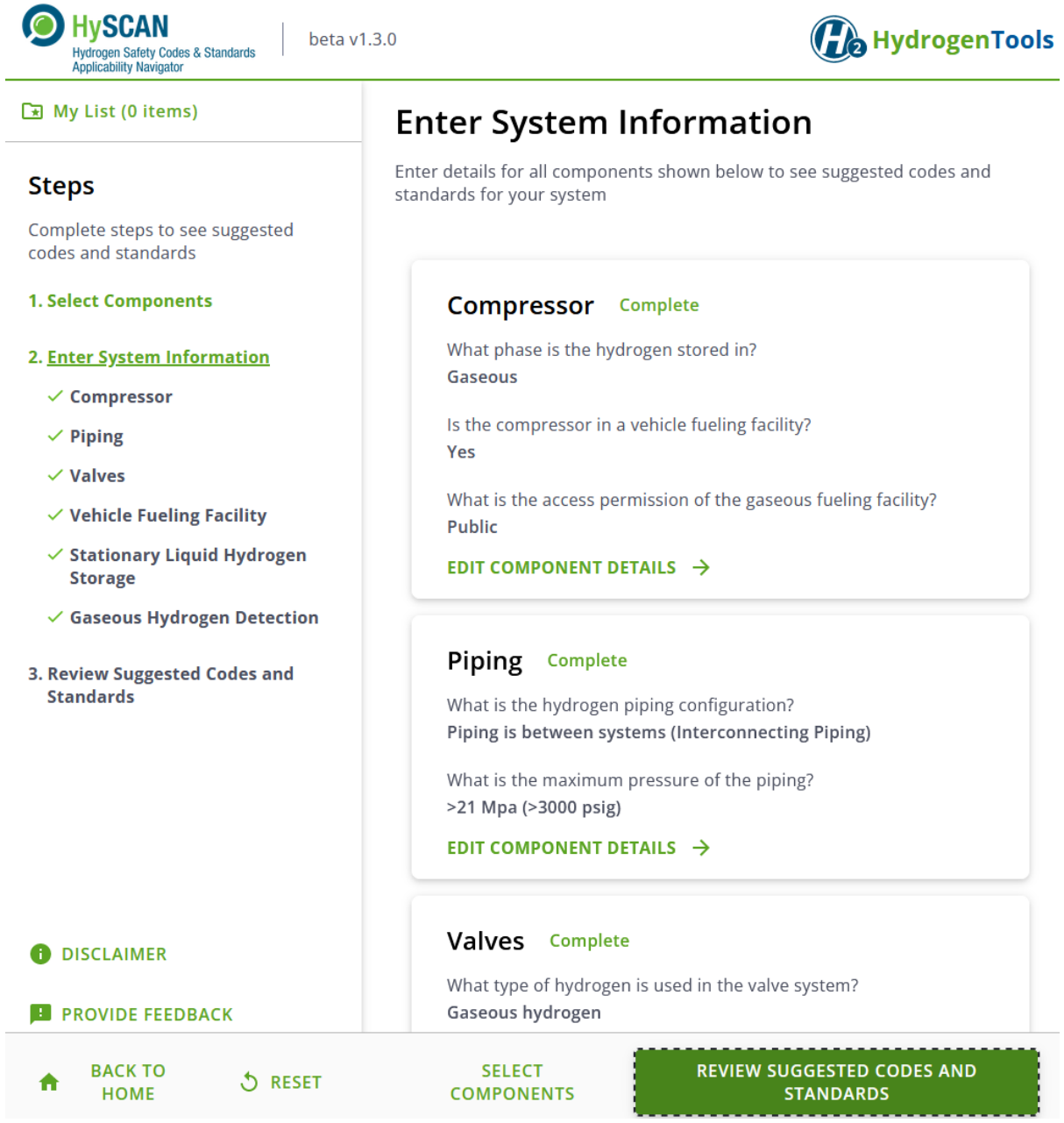
- Compressor
- Piping*
- Valves*
- Vehicle Fueling Facility
- Stationary Liquid Hydrogen Storage
- Detection (Gaseous Hydrogen Detection)*

* Commonly included components in many systems



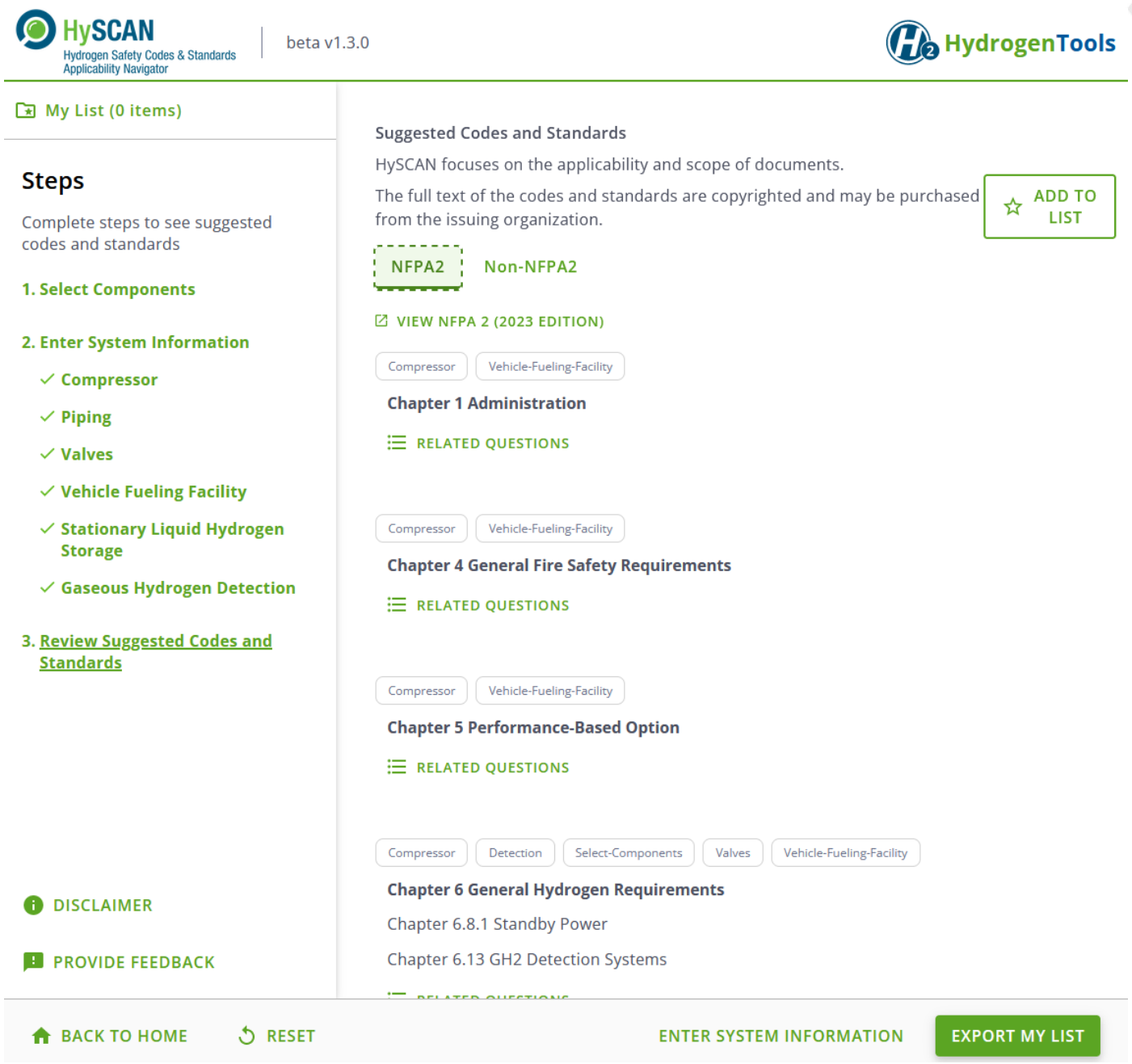
EXAMPLE 1 SYSTEM INFORMATION

- Questions for each component type
- Some questions lead to additional questions



EXAMPLE 1 RESULTS

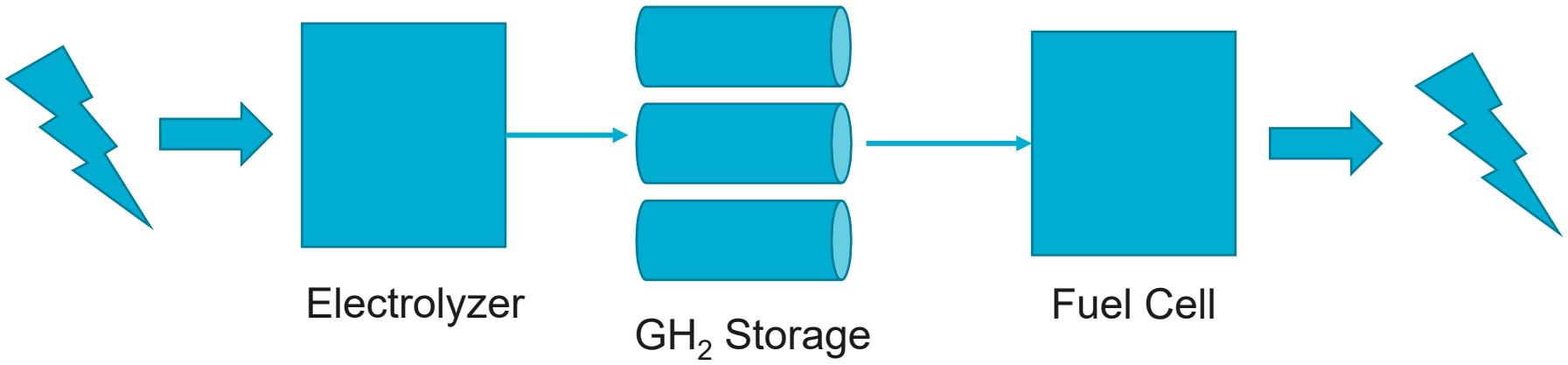
- Specific sections in NFPA 2:
  - General requirements
  - Liquid hydrogen storage chapter
  - Vehicle refueling chapter
- Non-NFPA 2 codes and standards:
  - CSA, ASME, CGA, ISO



EXAMPLE 2: HYDROGEN BACK-UP POWER SYSTEM

EXAMPLE 2 INTRO

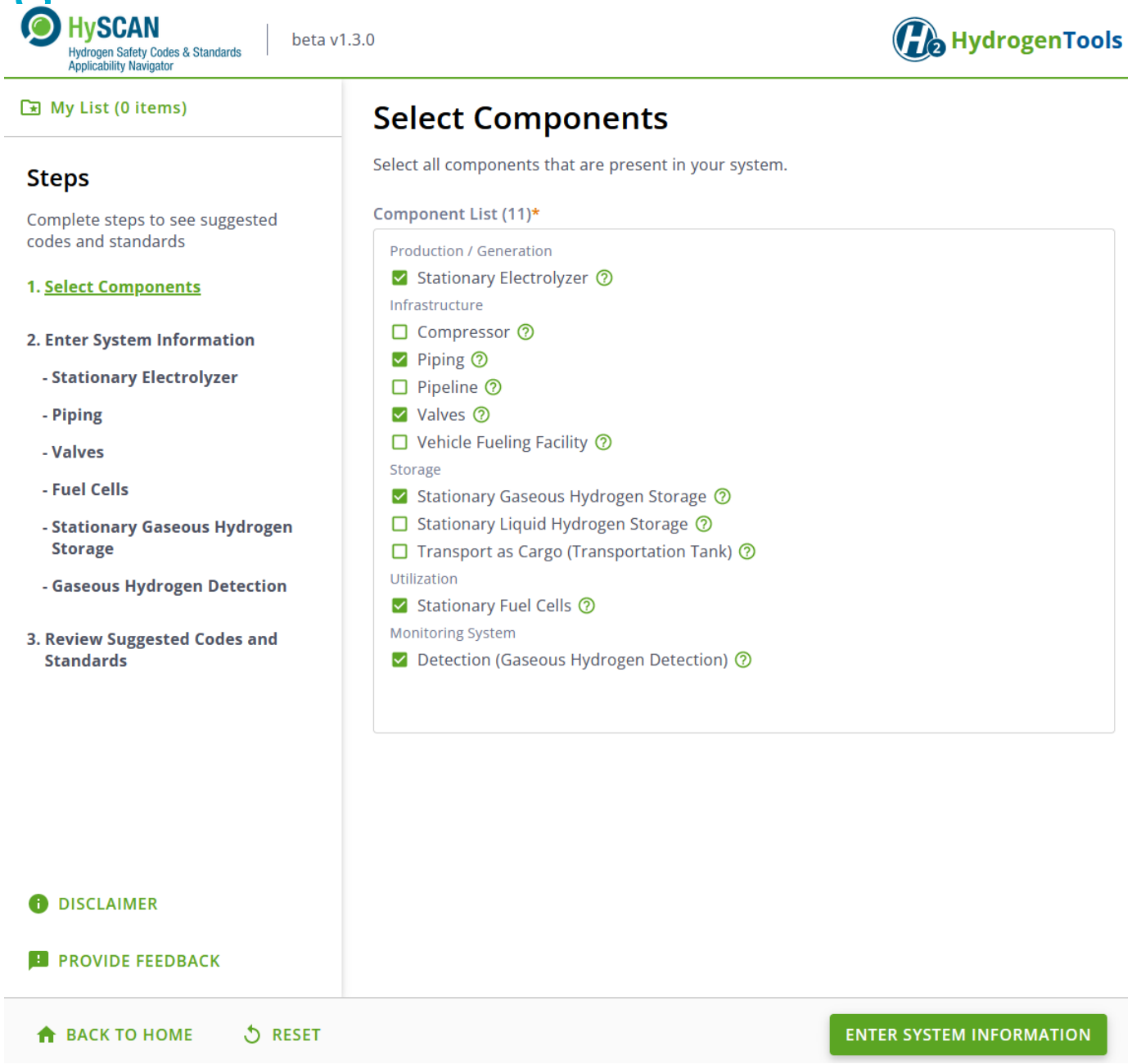
- Electrolyzer produces gaseous hydrogen
- Gaseous hydrogen stored on-site
- Fuel cell converts gaseous hydrogen to power as needed



EXAMPLE 2 COMPONENTS

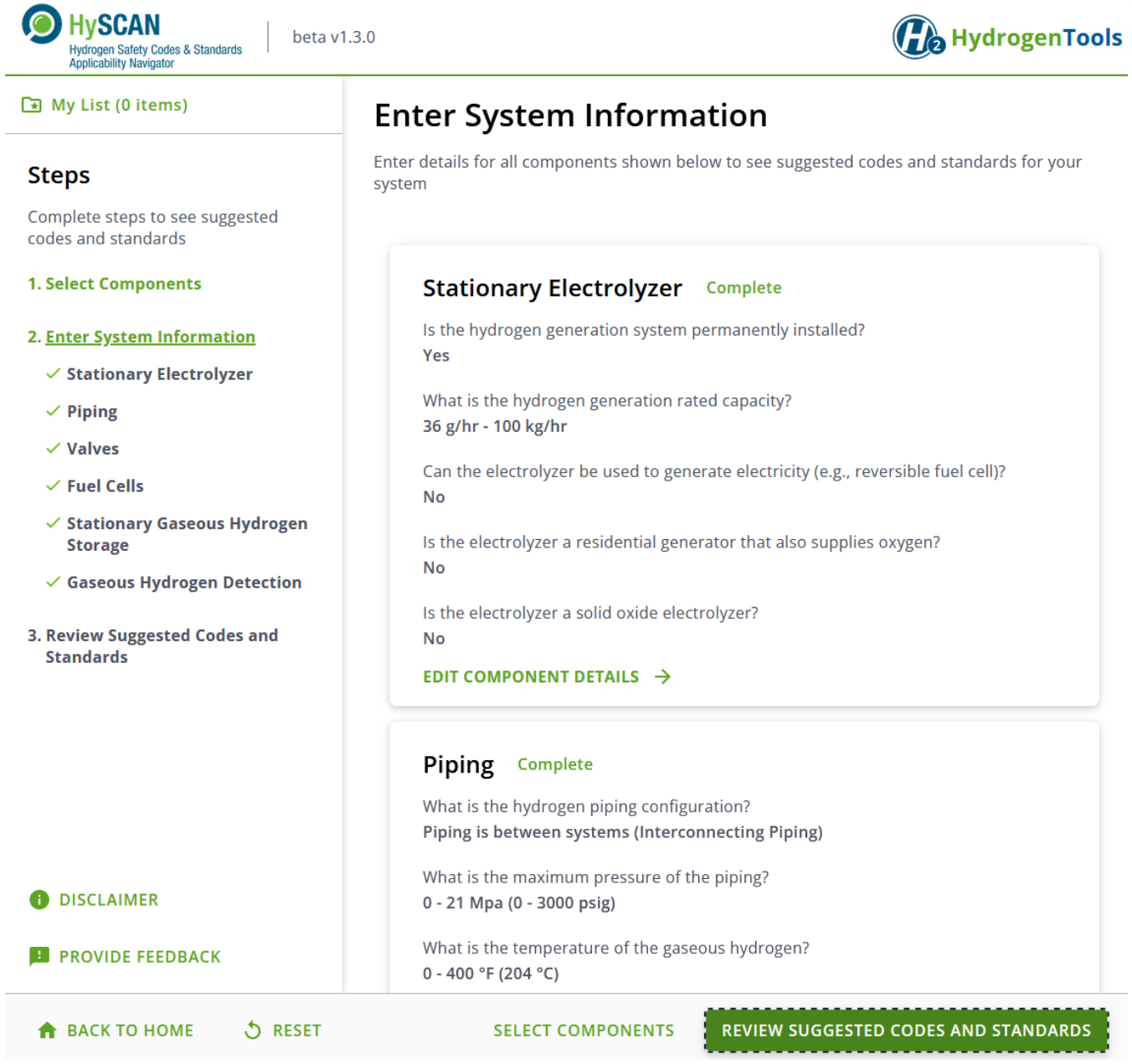
- Stationary Electrolyzer
- Piping*
- Valves*
- Stationary Gaseous Hydrogen Storage
- Detection (Gaseous Hydrogen Detection)*

* Commonly included components in many systems



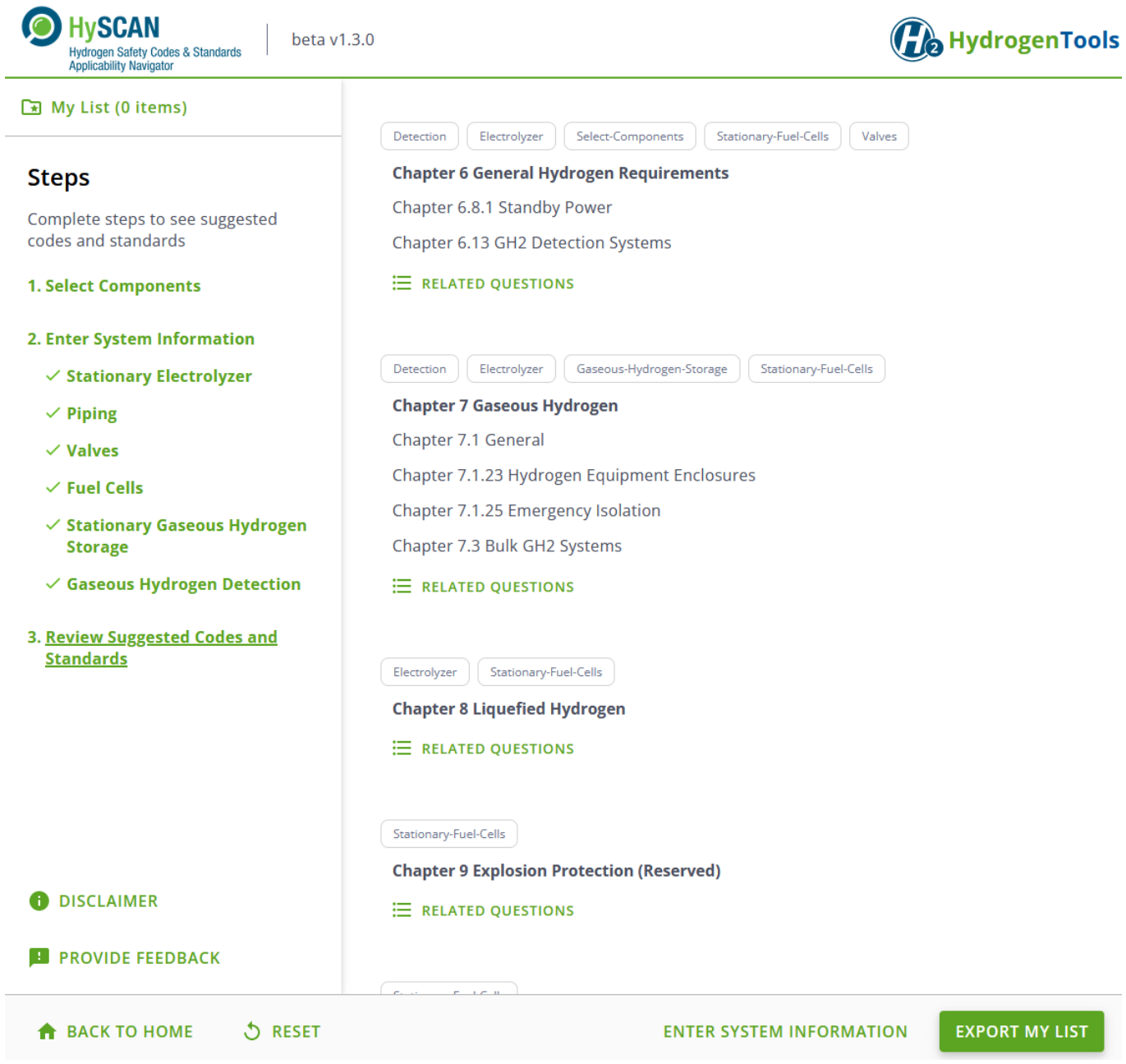
EXAMPLE 2 SYSTEM INFORMATION

- Questions for each component type
- Some questions lead to additional questions
- Same components may have different answers for different systems



EXAMPLE 2 RESULTS

- Specific Sections of NFPA 2:
  - General requirements
  - Gaseous hydrogen storage chapter
  - Fuel cell chapter
  - Electrolyzer chapter
  - Other NFPA documents
- Non-NFPA 2 Codes and Standards:
  - CSA, ASME, CGA, ISO



INFORMATIONAL TOOL AND INTENTION

- HySCAN is an **information tool**,
  - Not a way to track/verify compliance
  - Not a way to determine legal requirements for a particular jurisdiction

- The intention is to allow entities new to hydrogen to start the conversation
  - New system designers, new authorities having jurisdiction, members of the public

- The tool can help identify codes and standards that already exist
  - Even if not explicitly/legally required in a local jurisdiction

NEXT STEPS/FEEDBACK WANTED

- **We want feedback!**
  - Try out the tool, provide feedback to the team, and make suggestions for future improvements

- Possible future improvement options:
  - Adding example systems with components and questions pre-selected
  - Adding more documents for different types of components/systems
  - More detailed identification of sections/sub-sections for existing documents



Try out the tool: https://h2tools.org/hyscan

Provide feedback at: helpdesk@h2tools.org

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THANK YOU!

QUESTIONS?

HTTPS://H2TOOLS.ORG/HYSCAN