GREEN STORAGE COMMUNITY (formerly, Green Storage Initiative)

2024 Review and 2025 Plans

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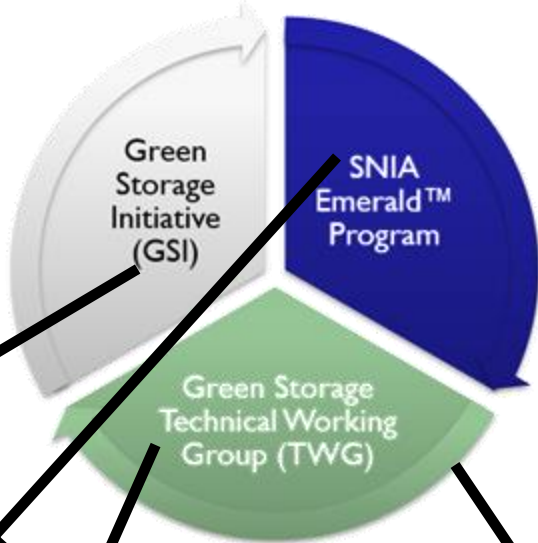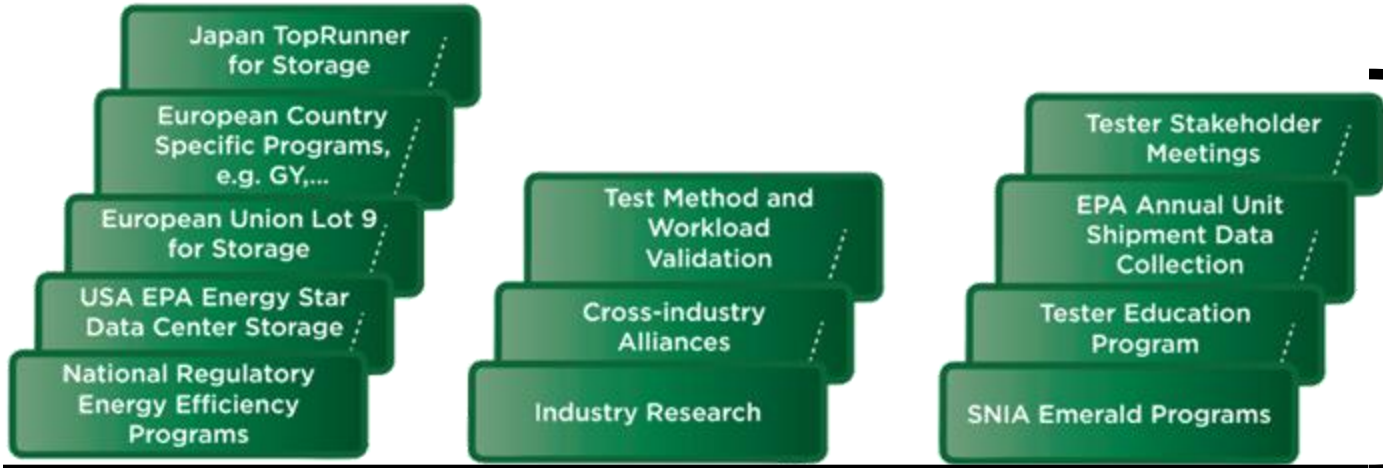
Green Storage Initiative (GSI) Mission
https://www.snia.org/forums/green

Focus Since 2008

SNIA Initiative where SNIA members collaborate on market requirements, education, alliances, and events to promote energy efficient storage and the SNIA Emerald Program

Green Storage Initiative (GSI)

SNIA Emerald™ Program

SNIA program to promote usage by vendors and test labs of the SNIA Emerald Test Specification and for IT professionals to reference energy usage metrics for storage vendor products to aide storage system procurement planning and optimization of IT storage operations

Green Storage Technical Working Group (TWG)

SNIA Emerald™

SNIA committee of technical storage system experts defining storage system energy measurement methodology, energy usage-related metrics, technical specifications, and best practices

Japan TopRunner for Storage

European Country Specific Programs, e.g. GY,...

European Union Lot 9 for Storage

USA EPA Energy Star Data Center Storage

National Regulatory Energy Efficiency Programs

Test Method and Workload Validation

Cross-industry Alliances

Industry Research

Tester Stakeholder Meetings

EPA Annual Unit Shipment Data Collection

Tester Education Program

SNIA Emerald Programs

SNIA Emerald™ Power Efficiency Measurement Specification for Enterprise Storage Systems
ISO/IEC 24091 – Information Technology – Power Efficiency Measurement Specification for Data Center Storage

SNIA Emerald™

New for 2023:
Storage Device-Level Power Efficiency Measurement Specification

Test Once, Report Many – Single WW Test Methodology; Regional Requirements

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GSI Work Items (slide 1 of 2)

2023-2024 Accomplishments

Completed: SNIA Emerald 5.0 planning for 2024

- **DONE**: Block IO workload tool replacement
  - vdBench → Calypso Test Suite
- **DONE:** File IO workload tool replacement
  - SPEC SFS 2014 → SPEC Storage Solution 2020
- TGG Alliance / EU Lot 9 regulations, EU other
- Data Analysis and Recommendations – SNIA-J for TopRunner.
- EPA Data Analysis DCS 2.1
- White paper for Storage Device-Level Power Efficiency Measurement (SDLPEM) translated Japanese
- SDLPEM Taxonomy and Test Methods

2025 Plans

- Complete SNIA Emerald 5.0 development
  - Modernizing tools and workloads a priority
- TGG Alliance / EU Lot 9 regulations
- EPA DCS Unit Shp Report for 2023&24
- Industry Stakeholder Meetings
- Tester Community Training for new SNIA Emerald V5.0 tools
- SDLPEM V1.0 Specification
  - Calypso Test Suite
  - Vendor Testing

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Green Storage TWG ROADMAP- 2025
Approximate and subject to change
Update 01-07-2025

#	Events	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Q1	Q2	Q3	Q4	CY2027
							CY2025								CY 2026			
1	SNIA-GTWG F2F / Invite EPA to concall			▽ vF2F				▽ vF2F			▽ vF2F			▽ SNIA Member vSymposium Jan '26				
2	EPA-SNIA Industry Meetings							…as needed…						▽ DCS Stakeholder Meeting				
3	ENERGY STAR Data Analysis (on file submittals)								▽ V2.0/2.1 data analysis									
4	Emerald Measurement Spec v5.0 / CTS lite replacement for Vdbench / Update to Spec Strorage 2020			▽ Spec V5.0 (internal draft)			▽ Spev V5.0 Public review	▽ Sbmit for SNIA Approval			▽ Publication							
5	ISO version of Emerald 5.0 (tentative)													▽ Submit to ISO		▽ Publish ISO standard based on Emerald 5.0		
6	Storage Device Level Power Efficiency Measurement			▽ Spec V1.0 Public review			▽ Submit for SNIA Approval		▽ Publication									
7	Futures																	
	Memory attached persistent storage		Investigate and make recommendations															
	Test methodologies for capacity optimization, data protection, etc. (impact on performance, energy consumption)																	
	Energy measurement for large / new distributed systems; consider small scale measurement as system indicator																	
	Collaborate w/ other Servers, Switch		SW-defined, Hyperconverged configs															
	Cloud data centers		Data caching, remote VS local, hybrid, etc. How to actually measure the energy efficiency?															
	Object storage		Is market large enough? Is growing, e.g. S3. Plug-ins available SPEC Storage 2020															
8	Partner Collaboration/Tracking		ESTAR, ITI/ TGG (incl 80PLUS, Digital EU), EU Lot 9, ASHRAE, SPEC-Storage/Power, SNIA-Jpn TopRunner, ISO,															

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USA EPA Energy Star
Data Center Storage v2.0 Test Reports, based on SNIA Emerald v4

https://www.energystar.gov/productfinder/product/certified-data-center-storage/results

D

- [ ] DELL (19)
- [ ] DELL EMC (5)
- [ ] Dell EMC Unity XT380 (1)
- [ ] Dell EMC Unity XT380F (1)
- [ ] Dell EMC Unity XT480 (1)
- [ ] Dell EMC Unity XT480F (1)

H

- [ ] Hewlett Packard Enterprise (3)
- [ ] Hitachi Vantara (3)
- [ ] HPE (5)
- [ ] HPE Primera (3)

I

- [ ] IBM (6)

L

- [ ] Lenovo (1)
- [ ] Lenovo (United States) Inc. (2)

N

- [ ] NetApp (7)
- [ ] NetApp, Inc. (3)

P

- [ ] Pure Storage (6)

S

- [ ] Seagate (3)

V

- [ ] Viking Enterprise Solutions (1)

2025 81 Test Reports 9 Vendors (Jan)
2024: 72 Test Reports 9 Vendors (Jun)
2023: 57 Test Reports 8 Vendors (Jun)

EPA Energy Star Program:
- Focus is systems with sellable SKU
- Block IO and File IO
- Vendor voluntary participation
- Results independent certification
- US Gov procurement priority

- Focus does not include composable systems, in-house proprietary designs, or consumer products.

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GSI Work Items (slide 2 of 2)

GSI Alliances and Cross Industry Work

Technology and Testing
- SPEC (SFS), Oracle (Vdbench (SPC community)), SPEC (power meters), S-FLOW, 80 Plus Ecova/EPRI (power supply testing), Calypso Testers, Quarch

Policy
- The Green Grid (+Digital Europe) (EU, EU country level pgms)
- SNIA-J (Japan)

Industry Regulatory
- EPA Energy Star (USA)
- TopRunner (Japan) (via SNIA-J)
- EU Lot 9 (via TGG → Digital Europe), Blue Angel, ETSI, others

International Standards
- SC39 / ITS 39

GSI/GreenTWG Cross-SNIA Group Collaboration

- S3 TWG/CMSI
  - Solid state storage taxonomy
  - S3 Test Methods/data collection
- SFF TA TWG (to be done)
  - EDSFF: Enterprise and Datacenter Standard Form Factor – Test Devices

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Challenges and Opportunities for 2025

- **Retain Single Test in all Geographies (system and roll-out device)**
  - If NO, then vendor costs increase to retain revenue streams in regulated geographies
- **Recruit New and Retain Existing volunteers**
  - Inability to take on new work and alliances such as OCP, regional policy setting groups
  - Green Programs rely on engineering resources and vendor members in-house test engineers and lab equipment
- **Timetables and alignment with regional policy setting groups**
  - Testing of specifications to validate fairness and overall quality assurance for repeatability in diverse test harness configurations w/o spec fixes
- **Opportunity to expand beyond TWG work**
  - Re-establish Green Storage Committee – marketing, alliances, market requirements, public speaking, tech notes/whitepapers/tech opinions

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Green Community Participation

- What is the expected industry impact of this work
  - One architecturally unbiased system and device test methodology to serve regulatory bodies worldwide
  - Industry knowledge of storage system and enterprise device power consumption and best practices/configurations to optimize power usage w/o compromising system functionality
  - **Opportunity to expand focus beyond TWG specification work**: data center and data best practices, regional policy advice, TCO Circularity, Capacity Optimization updated metrics/impact, lifecycle assessments with common baselines,
- What is the industry segment relevance
  - Storage System Manufacturers; Storage Device Manufacturers; DCIM SW Vendors
  - **With expanded work:** regional policy setters, data center IT planners, data lifecycle planners
  - **With expanded work:** whitepapers, webinars, selected trade event presentations
- Why you should join and participate in Green Community
  - Funnel and vet industry requirements into programs, alliances, and new/expanded technical work
  - Access to program mgt, data analysis, test validation, and industry training; industry awareness of your company's leadership
  - Refresh and renew focus on best practices (whitepapers, planning tools)
  - Avoid being surprised when a new regulation goes live and affects your product portfolio/revenues or supply chain
- Who to contact for additional information
  - Wayne M. Adams, waynemadams@gmail.com
  - Green Community SNIA Emerald Program Manager, David Thiel, emerald@snia.org