

The logo for Elaad.nl, featuring the text 'Elaad.nl' in a blue sans-serif font with a yellow lightning bolt graphic underneath, all contained within a white circular background.

Elaad.nl

Dutch OpenADR initiatives

Agenda



- 01** Public Grid Aware Charging

- 02** NL Flex – Smart Devices

- 03** FlexMCS – Megawatt Charging

- 04** DITM – CCAM

- 05** OpenADR tools

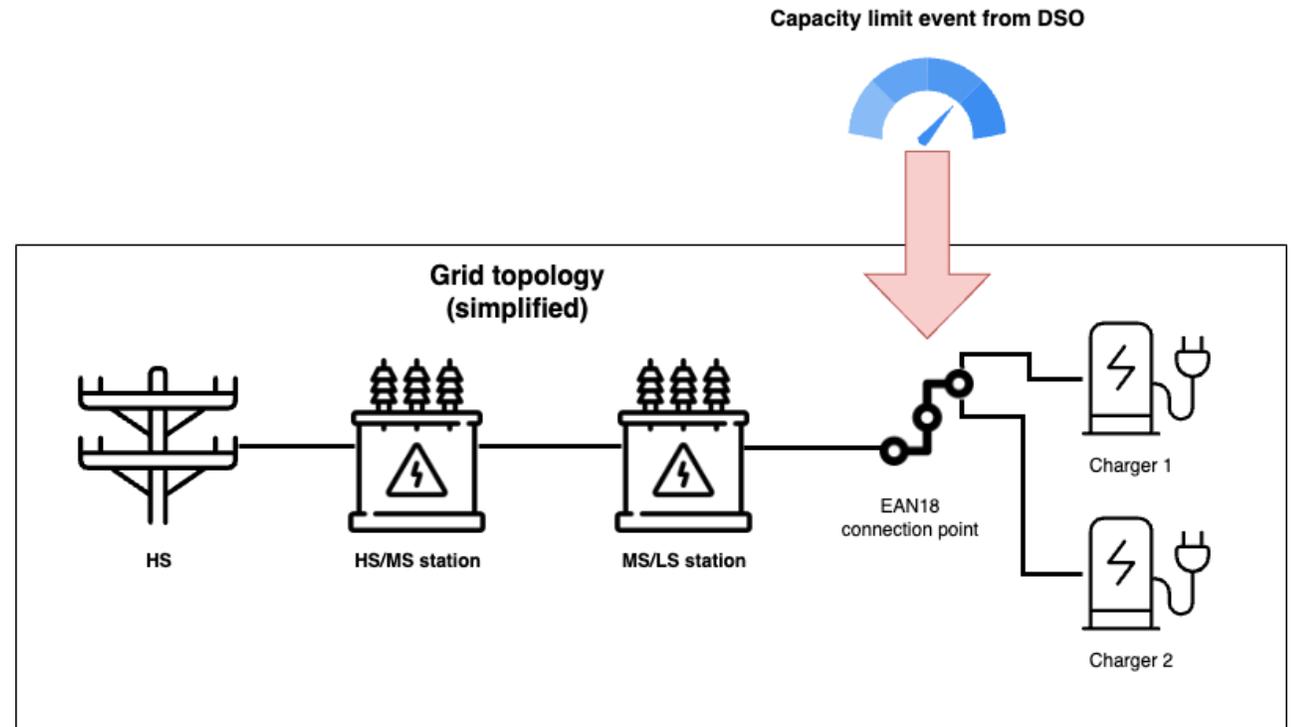
The logo for Elaadnl, featuring the company name in a blue sans-serif font with a yellow lightning bolt graphic underneath, all contained within a white circular background.

Elaadnl

Public Grid Aware Charging GAC

Current scope

- Public AC charging stations
- Focus on Dutch DSOs and CPOs (with international orientation)
- Simple DR signals: limit per cluster of PCCs



Implementation



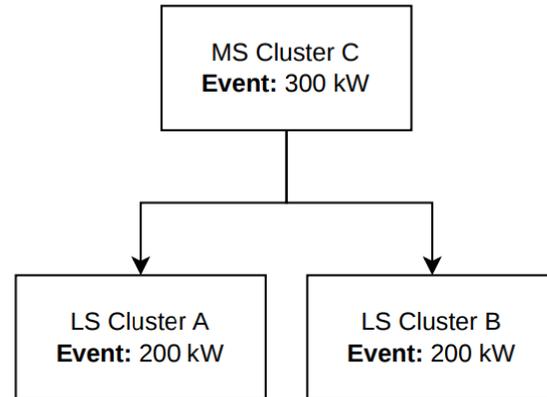
```
{
  "targets": [
    {
      "type": "POWER_SERVICE_LOCATION",
      "values": ["EAN87654321123456", "EAN123123123123123"]
    },
    {
      "type": "VEN_NAME",
      "values": ["NL-EAV"]
    }
  ],
  "payloadDescriptors": [
    {
      "payloadType": "IMPORT_CAPACITY_LIMIT",
      "units": "KW"
    }
  ],
  "intervals": [
    {
      "id": 0,
      "intervalPeriod": {
        "start": "2025-01-15T16:00:00Z",
        "duration": "PT1H"
      },
      "payloads": [
        {
          "type": "IMPORT_CAPACITY_LIMIT",
          "values": [10]
        }
      ]
    }
  ]
}
```



Status

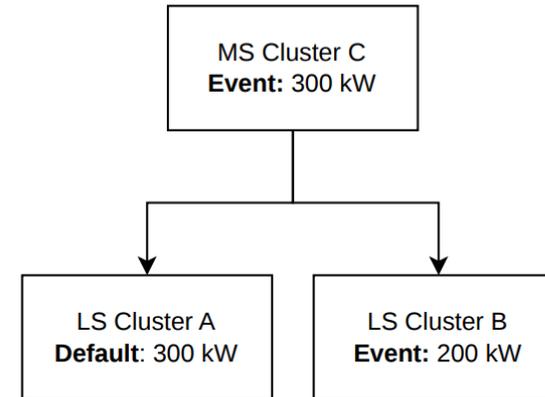
- GAC 2.0 has been released late 2025
 - Based on OpenADR 3.0
- Implementation status: partially operational
 - Several DSOs and CPOs have already implemented and are operational
 - Some use static profiles, others use dynamic profiles
- Future Plans: GAC 2.1
 - Upgrade to OpenADR 3.1
 - Focus: Hierarchical Clusters
 - Planned release: April 30th, 2026
 - Implementation deadline for VTN and VEN: October 1st, 2026

Future: Hierarchical Clusters



Aggregator decides distribution within LS, as long as limits are respected

LS Cluster A	LS Cluster B
150 kW	150 kW
200 kW	100 kW
50 kW	200 kW



Aggregator decides distribution within LS, as long as limits are respected

LS Cluster A	LS Cluster B
300 kW	0 kW
200 kW	100 kW
50 kW	200 kW

The logo for Elaadnl, featuring the company name in a blue sans-serif font with a yellow lightning bolt graphic underneath, all contained within a white circular background.

Elaadnl

PV, Battery, Heatpump

NL Flex

Intention



NL Flex – National collaboration between Dutch grid operators and energy suppliers to scale residential flexibility to relieve grid congestion.

Market-driven flexibility – Grid operators request flexibility, while suppliers and aggregators control consumer assets behind the meter.

Focus on household assets – Includes grid-aware home EV charging, home batteries, heat pumps, and other controllable devices.

From pilot to scalable solution – Goal is nationwide deployment of residential flexibility to support grid stability.

Current Pilots



PV/Solar

- Generation curtailment
- Intended live date: Summer 2026

Battery

- Generation and consumption curtailment
- Generation and consumption requests
- Intended live date: Winter 2026

Heatpumps

- Consumption curtailment
- Intended live date: Winter 2026

Role of OpenADR



Provide communication between DSOs and Aggregators



Allow flex requests based on grid domains, and allow Aggregator distribution of flex requests



Provide a flex capacity reporting path from Aggregator to DSO



Provide validation of delivery from Aggregator to DSO

Example Signal



Not available yet, we're currently looking at implementation details.

The logo for Elaadnl, featuring the company name in a blue sans-serif font with a yellow lightning bolt graphic underneath, all contained within a white circular background.

Elaadnl

European Megawatt Charging FlexMCS

Intention



Megawatt truck charging – FLEXMCS develops flexible high-power charging hubs for electric heavy-duty vehicles.

Grid-aware operation – Charging infrastructure must respond to grid constraints and congestion.

Site-aware operation – HDV charging will mostly happen at existing sites and should work with other on-site energy systems.

Interoperable control – Standardized signals allow scalable coordination between grid operators and charging infrastructure.

Large Demands, Big Guns



- Focus on the ~1 MW Class
- Up to around 3.75 MW per charger
- Concept Hub with 4 chargers



MCS plug

The role of OpenADR

- OpenADR 3
- Between Utility and hub/SEMS
- Day Ahead and intra-day being evaluated
- Import curtailment signal

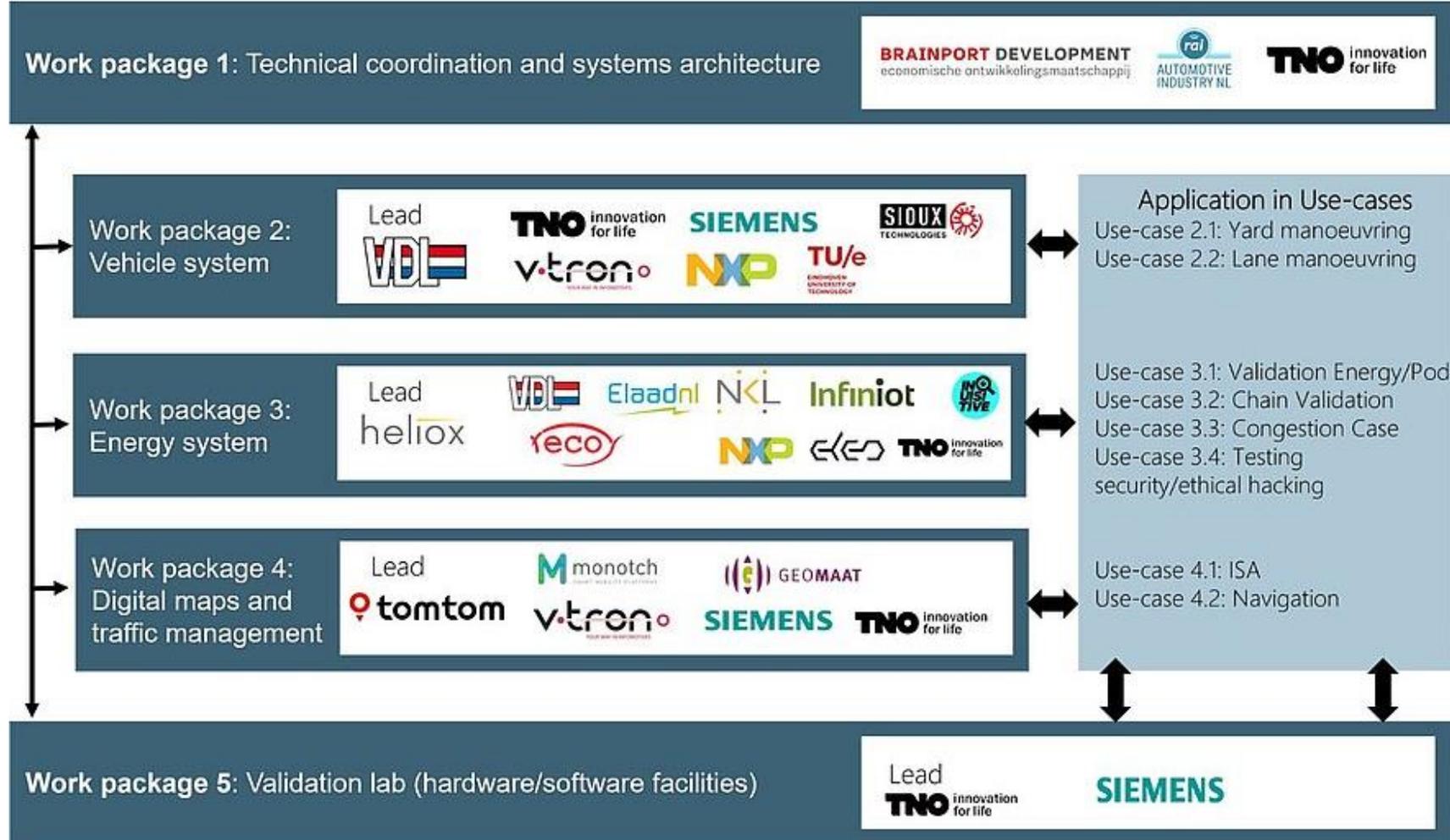
The logo for Elaadnl, featuring the company name in a blue sans-serif font with a yellow lightning bolt graphic underneath, all contained within a white circular background.

Elaadnl

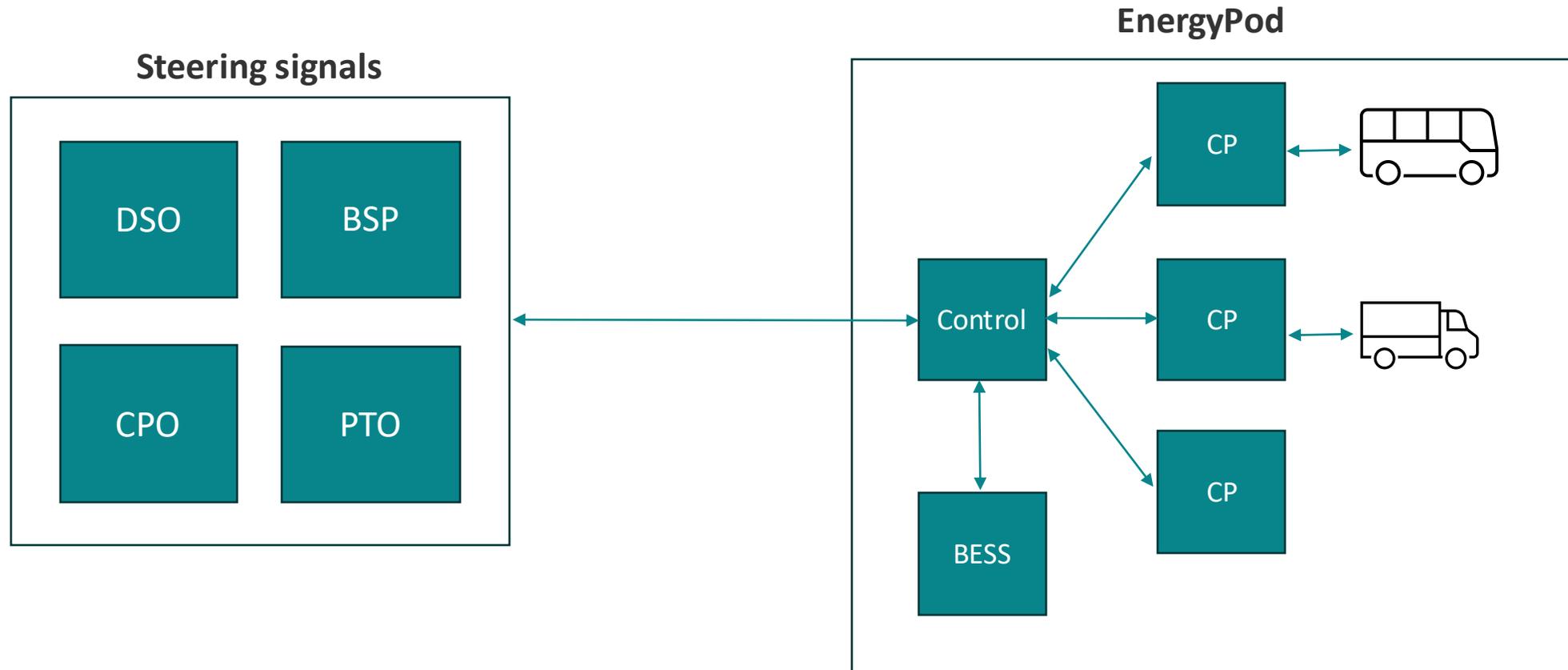
Cooperative, Connected and Automated Mobilitysystems

DITM

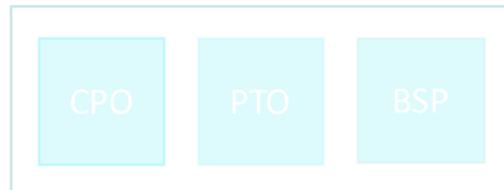
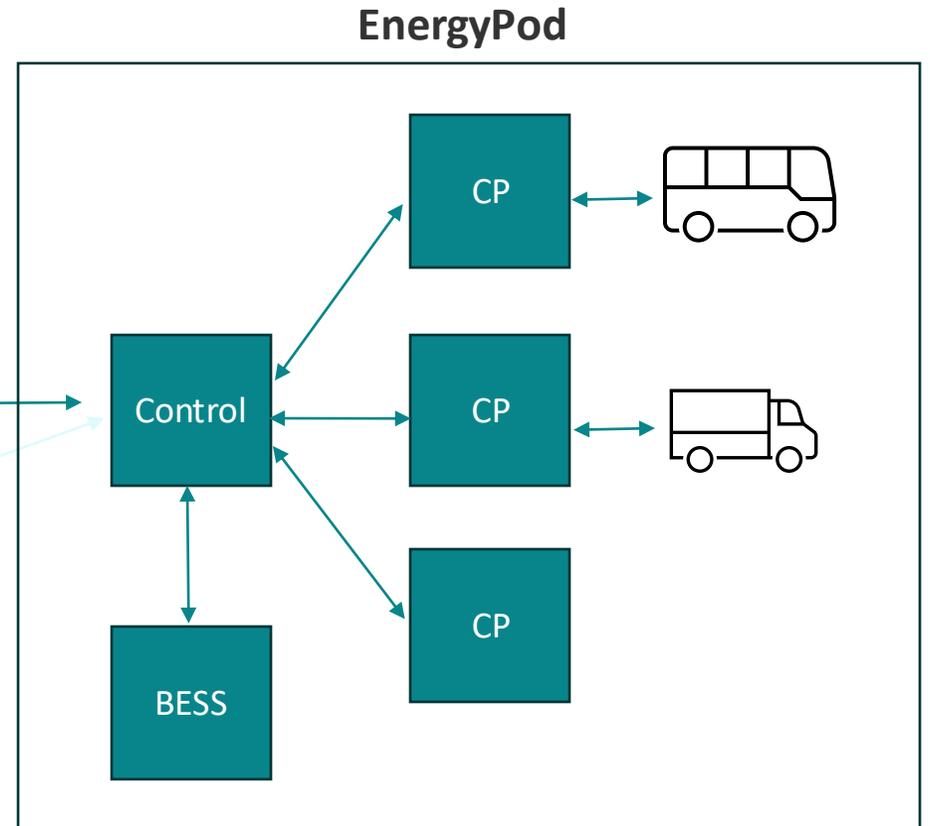
DITM overview



WP3 – Energy Systems



Energy System – Zoomed In



Control

CP

CP

CP

BESS

DSO

CPO

PTO

BSP

EnergyPod

CP

CP

CP

BESS

OpenADR signal

- OpenADR 3
- Day Ahead
- Import curtailment signal

```
"payloadDescriptors": [
  {
    "payloadType": "IMPORT_CAPACITY_LIMIT",
    "units": "KW"
  }
],
"intervals": [
  {
    "id": 0,
    "intervalPeriod": {
      "start": "2026-03-03T11:00:00+00:00",
      "duration": "P0Y0M0DT0H15M0S"
    },
    "payloads": [
      {
        "type": "IMPORT_CAPACITY_LIMIT",
        "values": [
          22
        ]
      }
    ]
  },
  {
    "id": 1,
    "intervalPeriod": {
      "start": "2026-03-03T11:15:00+00:00",
      "duration": "P0Y0M0DT0H15M0S"
    },
    "payloads": [
      {
        "type": "IMPORT_CAPACITY_LIMIT",
        "values": [
          22
        ]
      }
    ]
  },
  {
    "id": 2,
    "intervalPeriod": {
      "start": "2026-03-03T11:30:00+00:00",
      "duration": "P0Y0M0DT0H15M0S"
    },
    "payloads": [
      {
        "type": "IMPORT_CAPACITY_LIMIT",
        "values": [
          22
        ]
      }
    ]
  }
]
},
}
```

The logo for ElaadNL, featuring the text 'Elaadnl' in a blue sans-serif font with a yellow lightning bolt graphic underneath, all contained within a white circular background.

Elaadnl

Facilitated by ElaadNL

OpenADR Tools

Open Source Tools

- OpenLEADR-rs
 - Open-source implementation of OpenADR VTN (server)
 - Developed by Tweede Golf with ElaadNL
 - 3.0 supported, ongoing development on 3.1.
- OpenADR3-client
 - Open-source Python SDK for the VEN (client)
 - Developed by ElaadNL
- OpenADR3-GUI
 - Open-source graphical user interface for the VTN (server)
 - Developed by ElaadNL

GAC test tool



- Program compliance testing
- Not a replacement for the Alliance test tool, but an addition
- Built on top of OpenLEADR

The screenshot shows the 'GAC Test Overview / Test case details' page. On the left is a navigation sidebar with the Elaadnl logo and menu items: 'GAC Test Overview' (selected), 'VTN Provisioning', 'Connections', and 'Users'. The main content area is titled 'GAC-C0101 - Complete Test' and features a list of six test steps, each with a green checkmark icon: 'Get VENs', 'Check VENs for GAC Compliance', 'Get Programs', 'Check Programs for GAC Compliance', 'Get Events', and 'Check Events for GAC Compliance'. Below this list is a 'Back to dashboard' button. To the right of the test steps is a 'Requests' section with five expandable items: 'Get VENs', 'Check NL-ASC for GAC Compliance', 'Get Programs', 'Check test-program for GAC Compliance', 'Get Events', and 'Check 3 Events for GAC Compliance'. On the far right is a 'Details' panel showing a green 'Success' status, execution start time '01 aug 2025 15:08 pm', execution ID '47', test case name 'Complete Test', duration '4 seconds', and executed by 'nick test'. At the bottom of the details panel, a 'Results' section shows '6 Total', '6 Passed', and '0 Failed' with a green progress bar.