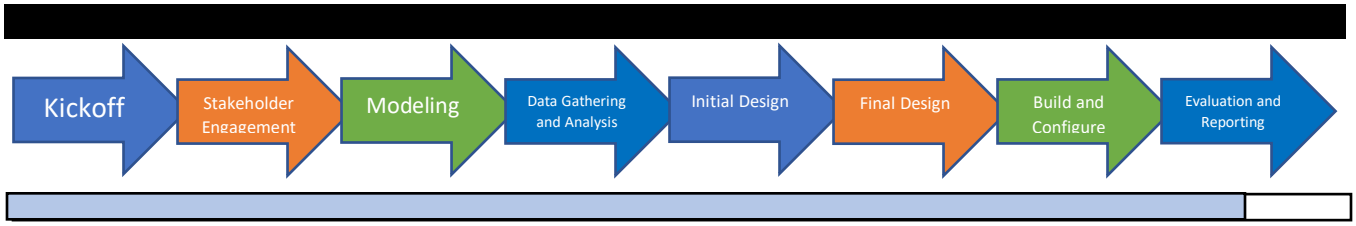
NYSEG and RG&E Flexible Interconnection Capacity Solution Date (2Q2024) Active

Project Start Date: 10/01/2015 **Project End Date:** 12/31/2024



Project Summary: The FICS demonstration project aims to test a new model for interconnection of DERs to the utilities' distribution systems. The new model uses Active Network Management to interconnect DERs to the grid using "flexible" capacity instead of using conventional firm capacity reinforcement. The flexible capacity model aims to reduce DER interconnection costs and aid economic viability. The Companies have commissioned two ANM schemes in the NYSEG and RG&E service territories.

Recent Lessons learned:

The sites currently deployed since 2021 have demonstrated the viability of Flexible Interconnections in the Companies' service territory by generating an estimated 8 GWh/year more than the static interconnection only scenario.

Application of lessons learned:

As of Q2 2024, the Companies are working on filing a revised Implementation Plan to expand the deployment of Flexible Interconnections to new locations.

Explanation for over budget:

This project has exceeded its originally forecasted budget due to the significant delays in permitting with DER #1 and the cancellation of other DERs that we have pursued as FICS candidates.

Recent Issues Identified:

- None

Solutions Identified:

- None

Recent Milestones/Targets Met:

- Both ANM Schemes were monitored for performance and continued data collection.
- Intermediate Summary Report Filed July 2024

Upcoming Milestones/Targets:

- Continue Operations and Data Collection at DERs #5-7
- Complete and file a revised FICS REV Demo Implementation Plan
- Decommission and Remove the ANM Scheme deployed at DER Site #1

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Flexible Interconnect Capacity Solution (FICS)

Reforming the Energy Vision (REV) Demonstration Project

Q2 2024 Quarterly Report

7/31/24

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01.
Executive Summary

1 Executive Summary

New York State Electric & Gas Corporation (NYSEG) and Rochester Gas and Electric Corporation (RG&E) (and together, the Companies) submits this quarterly report on the progress of the Flexible Interconnect Capacity Solutions (FICS) demonstration project. The FICS demonstration project tests a new model for interconnecting Distributed Energy Resources (DERs) to the distribution grid using Flexible capacity rather than static capacity. Flexible Interconnections allow participating DER to utilize the real-time hosting capacity of the portion of the grid they are interconnected to, referred to as "Dynamic Hosting Capacity," by providing direct feedback from the constrained point(s) on the grid to a centralized control system which can automatically limit the maximum output of the DER site if necessary to prevent the grid constraint from being violated. Flexible Interconnections can enable the interconnection of more DER capacity and the generation of more renewable energy without requiring expensive and time-consuming Static Capacity grid upgrades. The goal of the FICS REV Demonstration project was to pilot the Flexible Interconnection technology, alternative interconnection approach, develop a viable business model, to assess interest in the approach and allow it to be scaled to additional sites after the completion of the Demonstration period.

The Companies have successfully implemented two Flexible Interconnection schemes to date.

1. One (1) - 2 MW of solar photovoltaic (PV) in NYSEG's Plattsburgh division (DER #1)
2. Three (3) – 5 MW solar photovoltaic in RG&E's Rochester division (DERs #5-7)

During Q2 2024, both ANM Schemes were monitored for performance and data collection and the Companies filed an Intermediate Summary Report on the results of the FICS REV Demonstration Project.

Plans for Q3 2024 include:

- Continue operations and data collection at DERs #5-7
- Complete and file a revised FICS REV Demo Implementation Plan
- Decommission and remove the ANM Scheme deployed at DER Site #1

The following report provides a progress update on the tasks, milestones, checkpoints, and lessons learned to date.

02.
Quarterly Update

2 Demonstration Highlights

2.1 Activity Overview

Nine total interconnection applications for a total capacity of 31.15 MW were considered by the Companies for inclusion in the FICS REV Demo solution. Of those nine projects, four representing a total capacity of 17 MW signed a Flexible Interconnection Agreement and were tested and commissioned as part of the ANM Scheme. Of the nine applications considered for participation in the FICS project, three applications (DERs #1-3) were identified in the initial queue surveys, three applications (DERs #4, 8, and 9) were considered at the request of the developer, and the final three (DERs #5-7) were identified by the Companies later in the project cycle, because of their clear suitability for FICS. Table 1 summarizes the FICS Candidate Projects.

#	Size (MW)	DG Type	PCC Voltage (kV)	FICS Constraint	Deferred Capacity Upgrade(s)	Deferred Upgrade Cost Estimate	Application Result
1	1.98	Solar PV	12.47	Low-Voltage on Adjacent Feeder	Install Two (2) Single-Phase Line Regulators on adjacent feeder	$165,074	Flexible Interconnection
2	0.45	Farm Waste Generator	12.47	Substation Bank Thermal	Upgrade Sub. Transformer Bank	$3,875,000	Cancelled for failure to pay 25% of upgrade cost estimate by PSC mandated deadline
				Distribution Over-Voltage	Install New Three-Phase Line Regulator Bank	$70,000	
3	1.73	Solar PV	4.8	Substation Regulator Thermal	Upgrade Sub. Regulator Bank	$215,950	Cancelled for failure to pay 25% of upgrade cost estimate by PSC mandated deadline
				Distribution Over-Voltage	Install New Three-Phase Line Regulator Bank	$70,000	
4	2.00	Solar PV	4.8	Voltage Flicker	None	None	Cancelled for failure to pay 25% of upgrade cost estimate by PSC mandated deadline
5	5.00	Solar PV	12.47	Substation Bank Thermal	Substation Bank Thermal	$3,294,444	Flexible Interconnection
6	5.00	Solar PV	12.47	Substation Bank Thermal	Substation Bank Thermal	$3,294,444	Flexible Interconnection
7	5.00	Solar PV	12.47	Substation Bank Thermal	Substation Bank Thermal	$3,294,444	Flexible Interconnection
8	5.00	Solar PV	34.5	Voltage Regulator Variation	None	None	Cancelled at developer request prior to approaching RG&E about FICS
9	5.00	Solar PV	12.47	Voltage Flicker	None	None	Static Interconnection

Table 1 FICS Candidate Projects

Further details on the four (4) DER projects that signed Flexible Interconnection Agreements (DERs #1, 5, 6, and 7) are presented below. Additional information on the other five) projects considered for the project can be found in the Companies Intermediate Summary Report filed July 2024.

DER #1

Size (MW): 1.98
Type: Solar PV
Interconnecting Utility: NYSEG
Substation: Mason Corners
PCC Voltage: 12.47 kV
FICS Constraint: Low-Voltage on Adjacent Feeder
Deferred Capacity Upgrade: Install Two (2) Single-Phase Line Regulators on adjacent feeder
Deferred Upgrade Cost Estimate: $165,074
Application Result: Flexible Interconnection

DER #1[1] is a 1.98 MW Solar PV site that applied to interconnect to a 12.47 kV distribution feeder out of NYSEG's Mason Corners substation. The Coordinated Electric System Interconnection Review (CESIR) for the project identified a new Low-Voltage condition on an adjacent distribution circuit also originating from Mason Corners created by the proposed project under Maximum Loading conditions. The additional generation from this project on the Mason Corners circuit would raise the voltage at the 12.47 kV bus at the substation leading to a lower LTC tap position. While this reduced tap position was not anticipated to lead to low voltage on the distribution circuit where DER #1 would be interconnecting to because of the output of DER #1, it did lead to an observed low-voltage condition in two locations on the other circuit which did not have the output of a 2 MW DG to increase the voltage in this scenario. The proposed mitigation for the identified Low-Voltage issue was the installation of two (2) single-phase 100A line regulators on the adjacent feeder to regulate the voltage at the identified constraint locations to keep the voltage within service limits of 0.95 to 1.05 per unit (p.u.). NYSEG provided the developer for DER #1 a cost estimate of $165,074 for the installation of both regulators to resolve the low-voltage issue.

After DER #1 became a candidate for the FICS project, the developer and NYSEG executed an agreement on June 28th, 2016, to utilize FICS to defer the installation of the two voltage regulators. Under the terms of the FICS agreement, the developer agreed to pay NYSEG for the full cost of installing the 2 single-phase line regulators required to mitigate the low-voltage constraint identified in the CESIR in order to allow NYSEG to quickly fund and install the regulators if FICS was unable to address the anticipated low voltage issues or the amount of

[1] First identified in the Q1 2016 Quarterly Report (filed April 2016)

curtailment experienced by DER #1 was untenable to the site owner[2]. As was shared in the Q2 2016 Quarterly Report, the agreement with DER #1 did not include a platform-as-a-service fee because "there is insufficient financial incentive to participate in FICS unless they (the developer) are able to retain the expected interconnection savings in full following the demonstration term." Less than a month after executing the FICS agreement, the developer for DER #1 notified NYSEG in July 2016 that the project was on hold pending the outcome a NY State Department of Environmental Conservation (DEC) Grasslands Bird Study.[3] NYSEG placed the application on hold until May 2018 when the developer for DER #1 notified NYSEG that the DEC study was completed, and the project was clear to proceed to construction. While DER #1 was on hold, NYSEG continued to implement the necessary control and communications upgrades at its ECC and Mason Corners Substation. After removing the hold on DER #1, work on the design and construction of the required static capacity upgrades was reinitiated. In early 2019, NYSEG installed and brought into service the two deferred single-phase voltage regulators. This upgrade removed the requirement for the ANM Scheme governing DER #1 to be in place to allow DER #1 to enter service. NYSEG and the developer of DER #1 agreed to continue to move forward with a simplified version of the ANM Scheme to gain experience with ANM and demonstrate the effectiveness of the technology. DER #1 completed construction in Q4 2019 and received final acceptance from NYSEG on December 23rd, 2019. Due to delays caused by needing to revisit the cybersecurity of the ANM solution architecture[4], the COVID-19 Pandemic, and the increased focus on the contracting, design, and implementation of the ANM Scheme for DERs #5-7, the ANM Scheme for DER #1 completed testing and commissioning on November 8th, 2021.

The full timeline of execution of DER #1 is presented in Figure 1. Since the Companies have gathered sufficient data from DER #1 to prove the effectiveness of ANM at mitigating voltage violations in these scenarios, the Companies plan to decommission and remove the ANM control

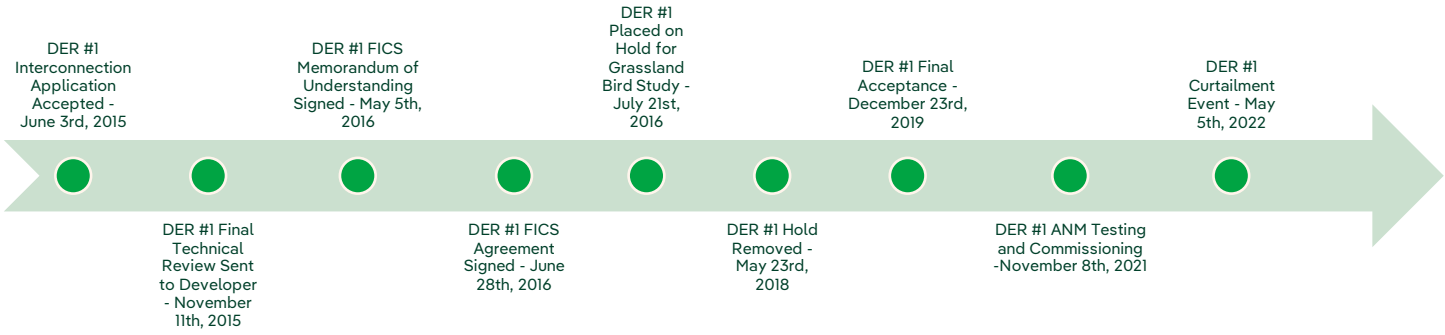

Figure 1 DER #1 FICS Interconnection Timeline

[2] Q2 2016 Quarterly Report (filed August 2016)
[3] First reported in the Q3 2016 Quarterly Report (filed October 2016)
[4] First referenced in the Q3 2019 Quarterly Report (filed October 2019)

scheme in Q3 2024. Decommissioning DER #1's ANM controls will allow the Companies to utilize the ANM license at another substation on their system.

DERs #5, 6, and 7

Size (MW): 15.00
Type: Solar PV
Interconnecting Utility: RG&E
Substation: Station 113
PCC Voltage: 12.47 kV
FICS Constraint: Substation Bank Thermal
Deferred Capacity Upgrade: Substation Bank Upgrade
Deferred Upgrade Cost Estimate: $3,294,444
Application Result: Flexible Interconnection

DERs #5, 6, and 7 are 5 MW solar PV projects that applied to interconnect to the three (3) 12.47 kV circuits, one project on each circuit, coming out of RG&E's Station 113. The original CESIRs, dated June 2018, identified a thermal constraint on the 12.47/115 kV transformer bank at Station 113 feeding the three project circuits due to the 14.2 MW of interconnected and queued generation ahead of the three DER applications causing the total DER capacity on the Station 113 transformer to exceed its 16.8 MVA[5] rating when any one of the 5 MW DER projects #5-7 is allowed to interconnect. The original CESIR required the project(s) to upgrade the size of the Station 113 transformer bank for an estimated cost of $3,294,444 to resolve the identified thermal constraint. At this stage of the project, the RG&E Distribution Planning team identified the projects as strong candidates for the FICS project due to the prohibitive cost of the required transformer bank upgrade and the amount of capacity that would not be able to interconnect without the transformer bank upgrade (12.4 MW). [6]

The FICS Project team agreed with the Distribution Planning assessment of the FICS potential of DERs #5-7 and approached the developer for DERs #5-7[7]. After the developer expressed interest in participating in the FICS Demo, RG&E partnered with Smarter Grid Solutions (SGS) to design a Flexible Interconnection solution for DERs #5-7 and conduct a curtailment assessment of the three DER projects. RG&E completed and provided the curtailment assessment to the developer in August 2018. The August 2018 curtailment assessment predicted that DERs #5-7 would experience just under 3% curtailment under a Flexible Interconnection with the full 15 MW of proposed solar PV capacity interconnected. Due to the potential for a 130% overload of the

[5] Thermal threshold used for planning purposes to determine when a DER project triggers an upgrade is 75% of the Continuous Nameplate Rating (CNR) of the piece of equipment in question.
[6] Projects first identified in the Q2 2018 Quarterly Report (filed July 2018)
[7] A single DER developer submitted the Interconnection applications for DERs #5, 6, and 7.

Station 113 substation transformer bank if the ANM system were to fail[8], RG&E determined that it was necessary to include a financial or technical backstop in the flexible interconnection arrangement with the developer for DERs #5-7. After discussions with RG&E and SGS, the developer decided to work with RG&E to design a direct-transfer-trip (DTT) protection scheme to trip off DERs #5-7 in the unlikely situation that the ANM system were to fail to reduce their output to desired operational levels.[9] RG&E updated the curtailment assessment in March 2020 to reflect cancellations in the interconnection queue of DERs ahead of DERs #5-7 and the installation of bifacial photovoltaic panels. The new curtailment assessment forecasted 0.27% total curtailment if the developer interconnected all 15 MW proposed across DERs #5-7.[10] Data on the actual curtailment observed at DERs #5-7 and how it compares to this pre-interconnection curtailment estimate is presented in 3.1.1.3 Metric 3: Share of Curtailed Generation in the Companies' Intermediate Summary Report[11].

RG&E and the developer executed an agreement in November 2020 to use a Flexible Interconnection utilizing ANM backed up by DTT to address the identified thermal constraint on the Station 113 transformer bank caused by DERs #5, 6, and 7. Under this agreement the DER developer covered the full implementation costs of the ANM and DTT schemes, the incremental licensing cost for the ANM scheme at Station 113, and two years of support from RG&E and SGS of the ANM scheme at Station 113 including an 8% Margin on the total ANM licensing and support costs. DERs #5, 6, and 7 completed construction and received Final Acceptance via the SIR process in December 2020 but were not allowed to operate above the 2.6 MW static capacity limit until the testing and commissioning of the ANM Scheme was completed in April 2021. DERs #5, 6, and 7 continue to operate under the Flexible Interconnection to this date and RG&E and the site owner of DERs #5, 6, and 7 are currently engaged in discussions to renew and update

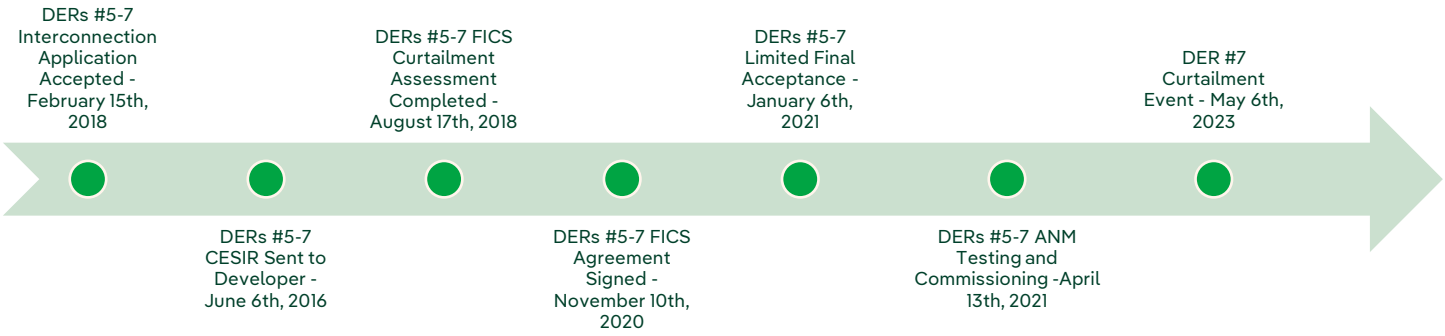

Figure 2 DERs #5-7 Interconnection Timeline

[8] RG&E projected the total DER capacity interconnected to Station 113 to be 29.2 MW and the CNR of the Station 113 transformer was 22.4 MVA meaning there was a potential for reaching 130% of the thermal CNR.
[9] Q4 2018 Quarterly Report (filed January 2019)
[10] Q1 2022 Quarterly Report (filed April 2022)
[11] https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C07BA790-0000-C32E-A44D-26DED70AB01C}

the ANM Agreement for the three DERs including continued payment of a support fee by DERs #5, 6, and 7 to cover the on-going O&M costs of the ANM Scheme.

Figure 2**Error! Reference source not found.** presents a detailed timeline for the implementation of FICS at DERs #5-7.

2.2 Metrics and Checkpoints

The Metrics and Checkpoints for the FICS REV Demo project were presented in Section 1 Table 6 of the Companies Implementation Plan. The project Checkpoints are shown below along with the observed results.

2.2.1 Checkpoints

The Companies proposed 6 Checkpoints in the FICS Implementation Plan. The 6 Checkpoints are reproduced in the section below as they were presented in the Implementation Plan. In general, of the 6 checkpoints, 5 checkpoint targets were met with one being partially met, Some Checkpoints were presented in the approved Implementation Plan with language stating the Companies would propose targets in later filings. For these Checkpoints without clear targets, the Companies have assumed a reasonable target based on the language of the Checkpoint proposed in the Implementation Plan.

Checkpoint	Description	Result
Selection of the FICS Option	**Measure:** The number and percentage of FICS-qualified projects that elect the FICS option expressed as both the number of projects and MWs. **Expected Target:** At least two DER developers in the NYSEG and/or RG&E territory will elect the FICS option during the demonstration term.	**Target Met** 4 out of 9 Projects (44%) 16.98 out of 31.16 MW (54%)
Interconnection Cost	**Measure:** The total utility infrastructure cost per MW interconnected and the avoided cost of network reinforcement that would otherwise be required. The original project metric proposed included Interconnection Timeframe but comparing the interconnection period during the demonstration term to that of a firm interconnection may be misleading since the timeline to deliver the ANM system does not accurately represent the timing of deploying ANM at additional DERs following the demonstration term. **Expected Target:** ANM projects in the U.K. have reduced interconnection costs by up to 90 percent. Interconnection costs for current and historical DER projects governed by the New York Standardized Interconnection Requirements vary by location depending on several factors,	**Target Met** Total FICS Cost per MW: $136,014 *(DERs #5-7)* Avoided Cost of Reinforcements: $2,763,887 *(DERs #5-7)*

	including size of the project, existing network topology, and required network reinforcement. Therefore, it is challenging to project expected cost avoided through FICS at this time.	
Additional MW Exported and Share of Generation Curtailed	**Measure:** The additional generation exported by participating DER installations (versus projected generation of the baseline firm interconnection capacity offered) and the share of generation curtailed expressed as a comparison between actual curtailment and forecasted curtailment. **Expected Target:** Additional DER generation exported will vary by project and site. The average DER project curtailment has been approximately five percent annually in the U.K.	**Target Met** Additional Energy Exported: 23,378 MWh *(DERs #5-7)* Forecasted: 0.27% Actual: 0.047%
Total FICS Utility Revenue	**Measure:** Utility revenues from platform-as-a service fees in the aggregate and on a per-MW basis for participating projects. **Expected Target:** The area of commercial development for the platform-as-a-service business model is a primary focus for testing. AVANGRID is aiming to obtain robust lessons learned on effective development of revenue opportunities from FICS. In the July 1, 2015, FICS proposal filing, AVANGRID examined various fee options that would cover the revenue requirements of adopting FICS capabilities, with analysis indicating that a $30,000 annual fee charged to each DER would cover the revenue requirements of ANM at scale with 32 DERs contracted.	**Target Met** [redacted] (DERs 5-7)
Customer Satisfaction	**Measure:** Key drivers and obstacles of FICS adoption among targeted DER developers. **Expected Target:** AVANGRID is aiming to obtain robust lessons learned from non-participating developers to inform future FICS site selection and outreach efforts and to gather lessons learned from participating developers to inform how ongoing ANM operations can meet developers' needs.	**Target Met** Survey Respondents rated their overall experience with the project a 4.5 out of 5
External Engagement	**Measure:** Lessons learned and opportunities for scaling FICS based on feedback from external, non-developer stakeholders with a role in DER development and interconnection in New York. **Expected Target:** AVANGRID will engage NYSERDA with the aim to gauge the statewide baseline interconnection record for funded DERs, to effectively develop the platform-as-a-service business model and identify opportunities for other ANM applications to increase DER	**Target Partially Met** Presentation to the ITWG March 2022 and on-going engagement with JU ITWG to review current interconnection challenges and solutions

	interconnections in New York. AVANGRID will engage the Joint Utilities to review current interconnection challenges and alternative interconnection solutions being developed in New York.

Table 2 Checkpoints and Results Overview

2.2.1.1 Checkpoint 1: Selection of the FICS Option

Measure	The number and percentage of FICS-qualified projects that elect the FICS option expressed as both the number of projects and MWs.
Expected Target	At least two DER developers in the NYSEG and/or RG&E territory will elect the FICS option during the demonstration term.
Result	4 Projects (44%); 16.98 MW (54%)
Target Met	Yes

As presented in Table 1 FICS Candidate Projects the FICS Project team considered a total of 9 DERs with a total capacity of 31.16 MW for participation in the Demo project. Of those 9 DERs, four for a total of 16.98 MW chose to move forward with a Flexible Interconnection.[12]

2.2.1.2 Checkpoint 2: Interconnection Cost

Measure	The total utility infrastructure cost per MW interconnected and the avoided cost of network reinforcement that would otherwise be required. The original project metric proposed included Interconnection Timeframe but comparing the interconnection period during the demonstration term to that of a firm interconnection may be misleading since the timeline to deliver the ANM system does not accurately represent the timing of deploying ANM at additional DERs following the demonstration term.

[12] Q1 2022 Quarterly Report (filed April 2022)

Expected Target	ANM projects in the U.K. have reduced interconnection costs by up to 90 percent. Interconnection costs for current and historical DER projects governed by the New York Standardized Interconnection Requirements vary by location depending on a number of factors, including size of the project, existing network topology, and required network reinforcement. Therefore, it is challenging to project expected cost avoided through FICS at this time. AVANGRID will propose reasonable comparative assumptions for Staff review.
Result	Total FICS Cost per MW: $136,014 (DERs #5-7); Avoided Cost of Reinforcements: $2,763,887 (DERs #5-7)
Target Met	Yes

By choosing a Flexible Interconnection instead of a Static Interconnection, DERs #5-7 realized a total $2,763,887 of upgrade cost savings when the Companies compared the actuals for the three projects to the total static upgrade cost estimate, $4,450,468, provided in the original static CESIRs for the projects. This amounts to a total savings of 62.1%[13] of the original cost estimate with redundant costs removed. The total flexible capacity interconnected by DERs #5, 6, and 7 is 12.4 MW[14]. The total cost per MW flexibly interconnected was $136,014.

The actuals for the Flexible Interconnection solution for DERs #5-7 does include support for the two-year term of the demonstration project but does not include the ~$30,000 total annual support cost the three flexible DERs are responsible for as long as they are operating under the ANM Scheme on Station 113. Assuming another 23 years of useful life for a total of 25 years in service, the total additional cost from these support payments is $690,000 for a NPV of $404,657 assuming a 5% discount rate. If this on-going support cost over the remaining 23 years of operation is factored into the business case for the projects, the Flexible Interconnection option comes out to $2,359,229 less expensive than the Static Interconnection option.

[13] First reported in the Q1 2023 Quarterly Report (filed April 2023) as a 61.8% savings. The analysis was reviewed, and the total savings was determined to be 62.1%
[14] 15 MW total capacity – 2.6 MW studied static capacity = 12.4 MW flexible capacity

2.2.1.3 Checkpoint 3: Additional MW Exported and Share of Generation Curtailed

Measure	The additional generation exported by participating DER installations (versus projected generation of the baseline firm interconnection capacity offered) and the share of generation curtailed expressed as a comparison between actual curtailment and forecasted curtailment.
Expected Target	Additional DER generation exported will vary by project and site. The average DER project curtailment has been approximately five percent annually in the U.K.
Result	Additional Energy Exported: 26,014 MWh (DERs #5-7); Forecasted vs. Actual Curtailment: 0.27% (Forecasted), 0.047% (Actual)
Target Met	Yes

Since they began operation in April 2021, AVANGRID estimates that DERs #5-7 generated 26,014 MWh more energy than would have been generated if only the static capacity of the Station 113

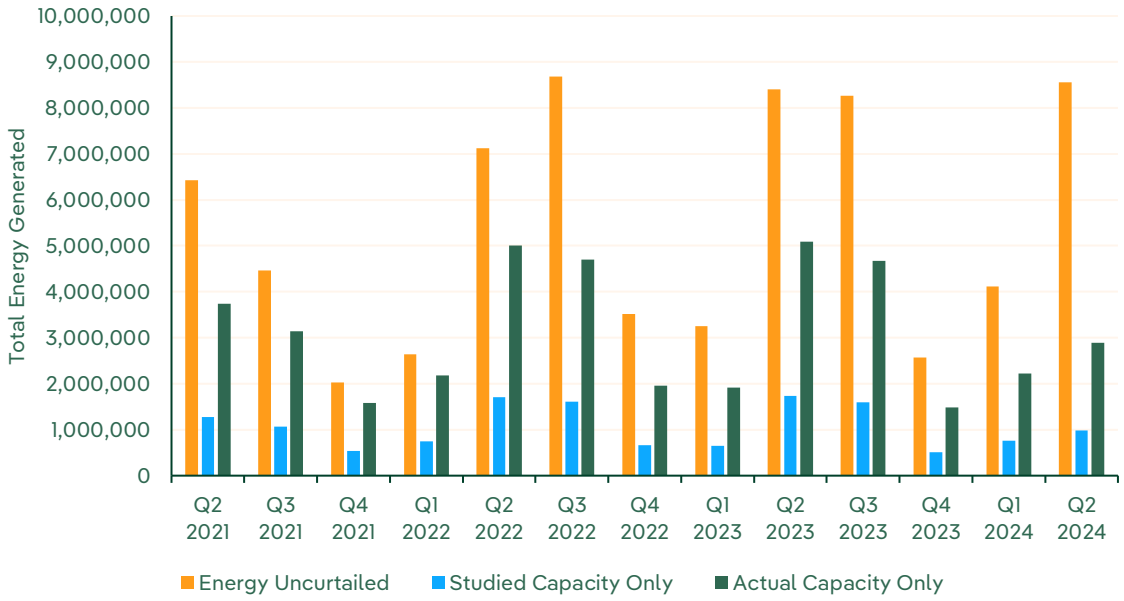

Figure 3 Actual Flexible Energy Generated vs. Projected Static Energy Generated

substation transformer had been allowed to interconnect.[15] This is an average of about 8,094 MWh per year of operation, which is enough to power 1,170 New York households for that time.[16]

Figure 3 Actual Flexible Energy Generated vs. Projected Static Energy Generated presents the total actual energy generated by DERs #5-7 in each quarter compared to the projected energy that would have been generated in that quarter by DERs #5-7 if the combined capacity of the three sites had been limited to the studied amount of static hosting capacity available (2.6 MW) or the actual amount of static hosting capacity available (7.6 MW). Figure 3 clearly shows how Flexible Interconnections can support NY's clean energy goals by allowing more PV generation to be safely interconnected at the distribution level without requiring expensive system upgrades.

[15] In the case of DERs #5-7 this capacity is different from the studied static capacity because a 5 MW DER application that was before DERs #5-7 in the queue was cancelled after RG&E performed the CESIR study for DERs #5-7.
[16] *https://www.eia.gov/consumption/residential/data/2020/state/pdf/ce4.6.el.st.pdf*

The predicted Network Curtailment percentage included in the revised Curtailment Analysis provided to the developer for DERs #5-7 in March 2020 was 0.27%. This estimated curtailment percentage was based on the predicted total energy generated by the three 5 MW sites annually. The Actual Network Curtailment percentage experienced by DERs #5-7 totaled 0.047% of the total energy generated over the 3+ years they have been in operation. To calculate the amount of energy generation lost to network curtailment, the Companies utilized generation data from other PV interconnected on Station 113 to estimate the amount of energy that would have been generated by DERs #5-7 if not curtailed during the given time interval. The variance between the Forecasted and Actual curtailment is due primarily to the conservative assumptions, mainly that DERs #5-7 are assumed to have 100% availability, utilized in the Curtailment Analysis and load growth on the circuits supplied by Station 113 between when the loading data utilized in the Curtailment Analysis was measured and when the 3 Flexible DERs went into service. The amount of Network Curtailment by site and by year for DERs #5-7 is presented in Figure 4 Network Curtailment by Site and Year for DERs #5-7. As shown in Figure 4, while the amount of Network Curtailment remained very low, the Companies observed a significant increase in Curtailment events in Q2 2024.

Figure 4 Network Curtailment by Site and Year for DERs #5-7

While NYSEG did perform a curtailment analysis and share it with the developer for DER #1, the Flexible Interconnection scenario analyzed was different from the scenario deployed at the site in 2021 due to the planned deferred upgrades being installed by that time. The difference between these two scenarios makes it difficult to compare the forecasted curtailment to the

actual curtailment. DER #1 was only curtailed due to the measured PCC voltage once in the two years it has been operating.[17]

Only Network Curtailment, curtailment of the DERs due to the ANM system receiving readings from a measurement point above the assigned Trim Threshold, is considered for this metric since this is the type of curtailment that the Curtailment Analysis attempts to forecast. The energy lost when the ANM Scheme curtails a DER to a safe output following a loss of visibility of system conditions, referred to Non-Network Curtailment, also impacts the amount of energy a Flexibly Interconnected DER can generate. The reliability of the communications medium is a critical factor in the amount of Non-Network Curtailment a site can experience, but even the most reliable communications mediums will not be 100% reliable. The Companies observed between 6-11% Non-Network Curtailment in 2021 due to issues with the communications interface between the ANM Element and DER Local Control System (LCS). In Figure 5 we see that once these issues were resolved by an update to the ANM Element logic in late 2021, the amount of Non-Network Curtailment went down drastically in 2022 through 2024 reaching between 0.0 and 0.3% in 2023 across DERs #5-7. The Companies expect future observations of Non-Network Curtailment to be under 1% as seen in 2023.

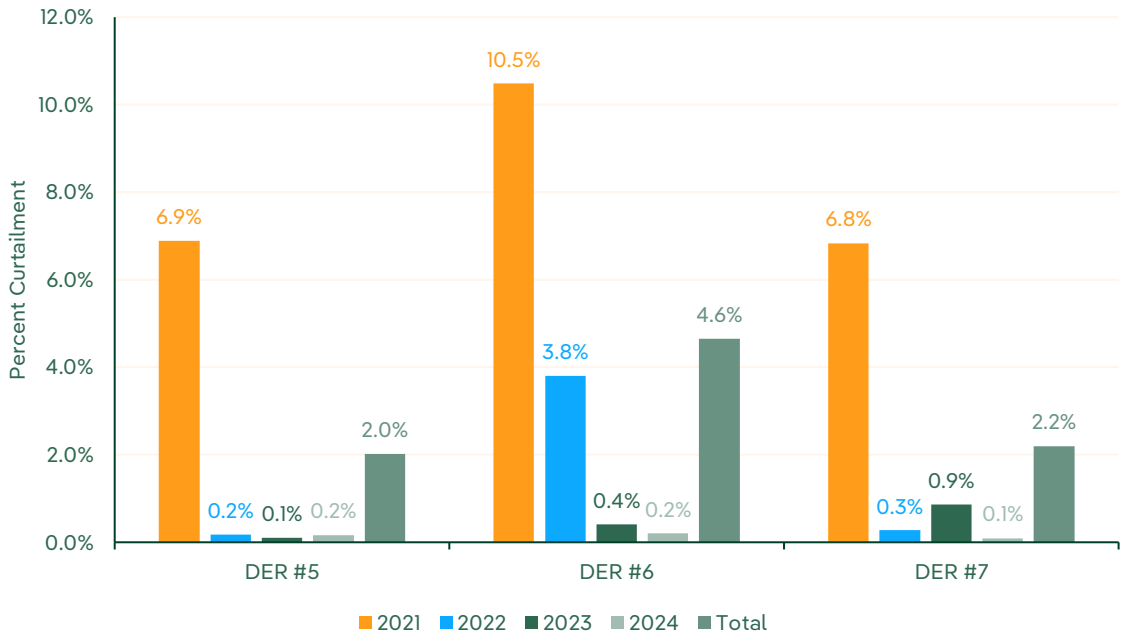

Figure 5 DERs #5-7 Non-Network Curtailment by Year

[17] Q2 2022 Quarterly Report (filed August 2022)

In addition to Network Curtailment and Non-Network Curtailment, there are other sources of lost generation for a DER site that are independent of whether the site received a Flexible or a Static Interconnection. Examples of these sources include but are not limited to:

- Utility hot line work in the same zone of protection as the DER site[18]
- DER distribution circuit out of normal configuration[19]
- Equipment failure at the DER site leading to site downtime while the equipment is repaired or replaced by the customer.
- Power outage on DER distribution circuit
- Travel time by customer operations and maintenance personnel to manually reconnect the DER site to the utility grid.

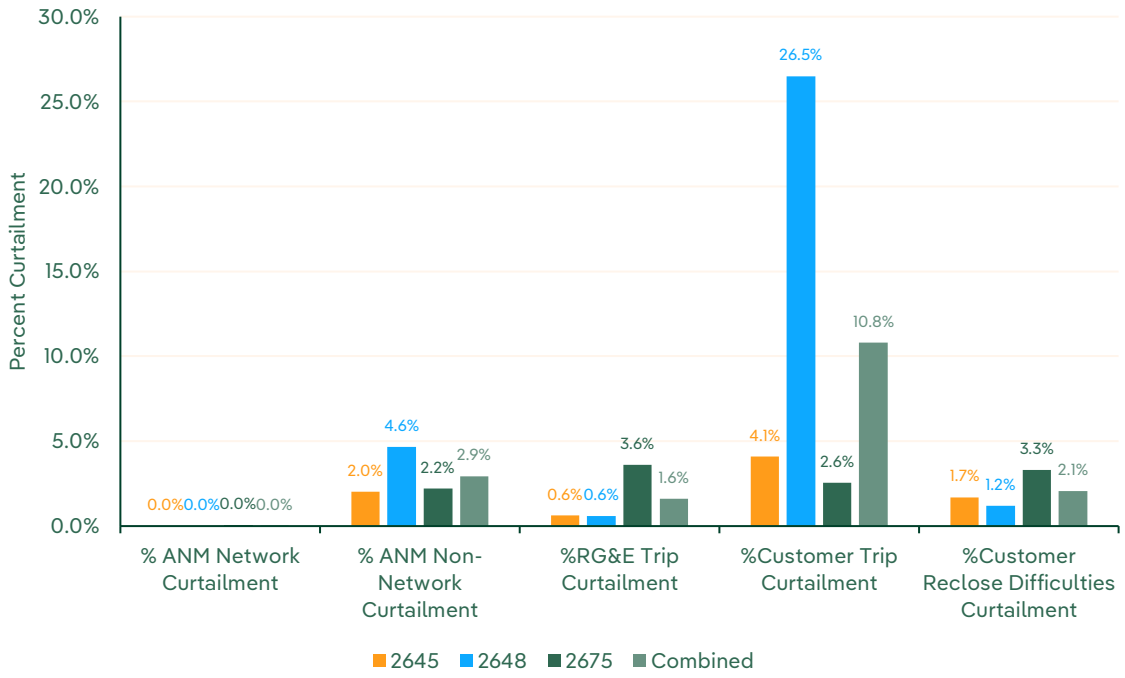

Figure 6 DERs #5-7 Percent Curtailment by Cause, Total

[18] RG&E Safety Protocols for Hotline Work dictate that all DER in the same zone of protection as the Hotline Work must be taken offline while the work is underway to protect the safety of utility personnel.
[19] NYSEG and RG&E Operating procedure dictates that all DER on a circuit be disconnected when the circuit enters an out of normal configuration. DERs can pay to have the site studied in the alternate configuration if requested.

These additional sources of DER downtimes do not affect the suitability of the DER site for Flexible Interconnection but are useful to track as they are a part of the DER customer experience and put the amount of ANM curtailment, both Network and Non-Network in context.

Figure 6 presents the total curtailment at each DER by each of the major causes observed over the course of this demonstration.

While DERs #5, 6, and 7 did experience between 2 and 4.6% ANM Non-Network curtailment per site over the course of this demonstration, this is significantly less than the combined curtailment from non-ANM sources which ranged from 6.6 to 26.5 percent per site over the course of this demonstration.

2.2.1.4 Checkpoint 4: Total FICS Utility Revenue

Measure	Utility revenues from platform-as-a service fees in the aggregate and on a per-MW basis for participating projects.
Expected Target	The area of commercial development for the platform-as-a-service business model is a primary focus for testing. AVANGRID is aiming to obtain robust lessons learned on effective development of revenue opportunities from FICS. In the July 1, 2015, FICS proposal filing, AVANGRID examined various fee options that would cover the revenue requirements of adopting FICS capabilities, with analysis indicating that a $30,000 annual fee charged to each DER would cover the revenue requirements of ANM at scale with 32 DERs contracted.
Result	[redacted]
Target Met	Yes

Within the Companies' initial proposal for the FICS project, the Companies proposed "to charge 'platform as a service' fees customized for each installation to reflect the DG rated capacity, location conditions, timing, and asset condition circumstances." In that same proposal document, the Companies assumed an annual fee per generator of $30,000 for these platform-as-a-service fees in the Revenue Model for the project for "illustrative purposes". The Companies classified this assumption by stating its intent was "to identify the fee 'floor'" and shared initial analysis that had identified $30,000 per generator per year as the breakeven point to cover the revenue requirements of the FICS solution once 32 generators had subscribed to the solution based on the cost assumptions available to the Companies at the time.

The $30,000 per site annual platform-as-a-service fee assumption was utilized again by the Companies in the FICS Project Implementation Plan with a specific reference to the analysis

presented in the July 1 FICS proposal filing that showed that $30,000 per generator per year was the breakeven point once 32 DERs were connected utilizing the FICS solution.

DER #1's Flexible Interconnection agreement did not include a platform-as-a-service fee. The Companies reported in their Q1 2016 Quarterly Update Report that:

"Candidate DER #1 has expressed that there is insufficient financial incentive to participate in FICS unless they are able to retain the expected interconnection savings in full following the demonstration term."

The "insufficient financial incentive" stems from the relatively low total value of the deferred regulator upgrades targeted by the FICS solution for DER #1, which was $165,074. The value to the developer of DER #1 of deferring these regulator upgrades would have been significantly reduced if a platform-as-a-service fee had been included in the Flexible Interconnection Agreement for the site and there would have been the potential the developer chose not to participate in the Demonstration Project.

The developer of DERs #5, 6, and 7 agreed to pay RG&E a total of [redacted] per 5 MW site[20], as part of the agreement between RG&E and the developer for DERs #5, 6, and 7 to be part of the FICS REV Demonstration Project. This fee included a portion of the ANM Strata system license cost, 2 years of Avangrid internal support of the ANM system at each DER site, 2 years of SGS support for the ANM system at each DER site, and an 8% revenue margin.[21] The Companies intend to continue to collect a support fee to help cover the site's portion of these incremental costs with a similar revenue margin while DERs 5, 6, and 7 continue to operate under a Flexible Interconnection agreement. While not yet finalized, the Companies are planning to charge a platform-as-a-service fee of [redacted] per year total across DERs #5, 6, and 7 going forward to cover the incremental O&M required to support the ANM system with an 8% revenue margin.

2.2.1.5 Checkpoint 5: Customer Satisfaction

Measure	Key drivers and obstacles of FICS adoption among targeted DER developers.
Expected Target	AVANGRID is aiming to obtain robust lessons learned from non-participating developers to inform future FICS site selection and outreach efforts and to gather lessons learned from participating

[20] Q3 2022 Quarterly Report (filed November 2022)
[21] Q4 2020 Quarterly Report (filed January 2021)

	developers to inform how ongoing ANM operations can meet developers' needs.
Result	Two (2) Developer Surveys Completed; Participant Developer Survey: Respondents rated their overall experience with the project a 4.5 out of 5; General Developer Survey: 85% of Respondents said they supported Flexible Interconnection as an alternative to conventional "static" capacity
Target Met	Yes

AVANGRID was able to gather several lessons learned from the FICS site selection process and outreach process. The Companies presented its Lessons Learned throughout the Demonstration Project in their Quarterly Demonstration Project Reports, and a detailed comprehensive list was included in the Intermediate Summary Report filed in July 2024. For more on the Lessons Learned from the FICS REV Demonstration Project so far and the Participant Developer and General Developer Surveys, see 3.3 Lessons Learned and 3.2 Customer Reception respectively in the Intermediate Summary Report.[22]

2.2.1.6 Checkpoint 6: External Engagement

Measure	Lessons learned and opportunities for scaling FICS based on feedback from external, non-developer stakeholders with a role in DER development and interconnection in New York.
Expected Target	AVANGRID will engage NYSERDA with the aim to gauge the state-wide baseline interconnection record for funded DERs, to effectively develop the platform-as-a-service business model and identify opportunities for other ANM applications to increase DER interconnections in New York. AVANGRID will engage the Joint Utilities to review current interconnection challenges and alternative interconnection solutions being developed in New York.

[22] https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C07BA790-0000-C32E-A44D-26DED70AB01C}

Result	Presentation to the ITWG March 2022 and on-going engagement with JU ITWG to review current interconnection challenges and solutions
Target Met	Partially

AVANGRID has engaged a wide selection of external stakeholders throughout the course of this demonstration project to refine the Flexible Interconnection business model, define appropriate selection criteria for candidate sites, and share lessons learned from the active demonstration sites. The external stakeholders AVANGRID has engaged with throughout this project include, NYSEIA, individual community distributed generation developers, other NY Joint Utilities (JU), and DPS Staff. AVANGRID has also engaged with industry groups throughout the course of this demonstration project, including groups facilitated by the US Department of Energy Solar Energy Technologies Office (SETO), NREL, and EPRI. In addition, the AVANGRID FICS Project team presented to the NY Public ITWG in March 2022[23] and has remained engaged in the NY ITWG since that presentation to understand current interconnection challenges and developer readiness for Flexible Interconnections.

AVANGRID's engagement with NYSERDA was limited to both parties' engagement in the ITWG over the course of the demo project and the AVANGRID participation in a NYSERDA PON funded project to develop a proof-of-concept advanced Interconnection Online Application Portal (IOAP) tool that integrated Flexible Interconnection review into the application process and several other potential process improvements.[24] AVANGRID worked with the individual developers submitting DER applications that were considered for the FICS project to understand the reasoning behind their ultimate decision to move forward with a Flexible Interconnection or not. AVANGRID worked with SGS and the individual developers of the FICS candidate sites to develop FICS platform-as-a-service business models that were suited to the needs of their individual sites.

2.3 Issues

A list of issues encountered on this project can be found in previous Quarterly Reports.

The Companies experienced no new issues in Q2 2024.

[23] First reported in the Q3 2022 Quarterly Report (filed November 2022)
[24] Q4 2016 Quarterly Report (filed January 2017)

3 Work Plan

3.1 Budget Review

The initial Project Budget presented in the Companies' Implementation Plan for the FICS REV Demo was [redacted] over 2015 and 2016. The Actual Spend on the FICS REV Demo at the time of the filing of this Report is [redacted] from 2015 to 2023. The additional spend is driven by the additional project identification, project management, and engineering work necessary to identify, design, and study additional project sites after several of the initially identified DER sites did not move forward with the Flexible Interconnection process or experienced environmental permitting delays. In addition, the Companies have incurred additional Licensing and Support costs to transition the ANM Scheme supporting DERs #5-7 to a permanent substation license and to acquire additional substation licenses in anticipation of scaling the project to additional substations as outlined in 4.2 Recommendations. The Companies expect much of these scaling costs to be offset by future revenue from participating DER sites.

The cumulative revenue requirements that have been deferred as of 12/31/2023 is $496K, made up of incremental O&M (including carrying cost) of $672k, net of tax benefits related to the incremental O&M of $176k, net of $0 revenues (after-tax) received. The revenue requirement provided represents only project costs that are not already in rates per the 2020 NY Rate Case Joint Proposal.

3.2 Updated Work Plan

Submit Revised Implementation Plan Decommission and Remove ANM Scheme at DER Site #1	

3.3 Next Quarter Planned Activities

In Q3 2024 the project team aims to complete the following tasks:

- Continue operations and data collection at DERs #5-7
- Complete and file a revised FICS REV Demo Implementation Plan
- Decommission and remove the ANM Scheme deployed at DER Site #1

4 Conclusion

4.1 Lessons Learned

A detailed inventory of the Lessons Learned to date from this REV Demonstration Project are presented in Section 3.3 Lessons Learned in the Intermediate Summary Report[25].

4.2 Recommendations

Based on the experience gained with Flexible Interconnections under this demonstration project, the Companies recommend the following:

- To expand the deployment of Flexible Interconnections to additional sites and additional DER technologies such as battery storage, battery storage paired with PV, or electric vehicle charging.
- To develop a detailed formal Flexible Interconnection process based on and integrated with the current NY SIR process.
- To target specific locations on the utility's system with limited static hosting capacity and expensive static capacity upgrades for new Flexible Interconnections
- To explore opportunities to pilot Flexible Interconnections to address constraints on the 34.5 kV Transmission system.
- To develop a standardized interface specification for Utility-to-DER communications required for Flexible Interconnections
- To explore technical improvements such as forecasting or seasonal capacity limits to reduce the amount of Non-Network Curtailment experienced by Flexible Interconnection sites.

[25] https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C07BA790-0000-C32E-A44D-26DED70AB01C}