

FlexScore: A Standardized Performance and Risk Score for DER Fleets

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1. Executive summary

Distributed energy resources are growing fast and increasingly organized as virtual power plants. Utilities, regulators, and insurers need dependable, transparent ways to assess performance and risk at the fleet level to plan grid upgrades, protect non-participants, and access new finance and insurance products. Today's mix of time-varying rates, program incentives, and one-off procurements do not consistently align with local distribution needs. Consequently, service providers face high non-performance and technology risks. There is evidence for a different path: performance-based compensation, stronger planning signals, and explicit risk screening to build trust in DER portfolios.

This paper proposes FlexScore. A standardized, explainable score that translates fleet behavior into underwriting-ready metrics: dependable kW during events, response latency, availability, technology maturity risk, and cyber posture. The score combines observed performance, telemetry health, interoperability indicators, and program history. These metrics support performance-based incentives, VPP dispatch, and new insurance offerings. It is designed to be transparent for regulators, actionable for utilities, and credible for insurers--so that DER can deliver measurable grid value at scale.

2. Why a standardized, explainable score is needed now

Mismatched incentives at the distribution level

- Time-varying retail rates and traditional demand-side programs sometimes fail to match hyper-local grid constraints or the hours that drive avoided distribution costs. Illinois State analysis recommends performance-based 'Additive Services' incentives tied to calls and measured output to align dispatch and accelerate 'learning by doing.' (*Illinois DER report, pp. 14-17, 96*)

Provider and customer value uncertainty

- DER service providers face technology risk, non-performance penalties, integration costs, and regulatory complexity--conditions that can erode margins and curb participation in constrained locations. (*Sourcing DER for Distribution Services*, pp. 20-22, 39-41)

Equity and access

- Federal incentives (e.g., IRA credits and rebates) and programs like Justice40 create opportunities to expand DER access, but adoption barriers for renters and low- to moderate-income customers persist. Targeted incentives and financing tools are needed to broaden participation and improve resilience. (*VP3 flipbook*, p. 68; *NREL VPP & Energy Justice*, pp. 17, 19, 35)

Insurance and bankability

- Battery storage now benefits from maturing warranties (cycles, availability) and expanding insurance capacity, but underwriters still need engineering insight and performance assurance. Standardized, fleet-level performance scoring can reduce uncertainty, improve coverage terms, and support financing. (*Volta Foundation Battery Report*, p. 150; *Hiscox BESS insurance*, pp. 2-3)

3. What FlexScore measures

FlexScore converts observed behavior and device/portfolio characteristics into a small set of decision-ready outputs:

Assured capacity and availability

- Average kW delivered during called events and an availability band by season and time window, adjusted for data quality, enrollment churn, and technology mix. (*Illinois performance incentive concept*, pp. 17, 96)

Response latency and controllability

- Measured ramp time and start-of-event response, accounting for communications paths and device interoperability. (*Sourcing DER for Distribution Services*, pp. 39-41)

Shape fit to local need

- Match of the fleet's output profile to feeder-level constraints (duration, timing, and locational concentration). (*Sourcing DER for Distribution Services*, pp. 14-18, 36-38)

Technology and business maturity risk

- Signals including device failure rates, API stability, and provider operational track record. (*Sourcing DER for Distribution Services*, pp. 39-41)

Cyber posture and data integrity

- Telemetry coverage, integrity checks, and process hygiene, reported in a non-intrusive, privacy-preserving manner to support underwriting. (*Infosys Journal on AI/cyber compliance*, pp. 48-50)

Each component is explainable with traceable inputs and standardized definitions so utilities, regulators, and insurers can 'look through' the score, audit assumptions, and link compensation or premium adjustments to verified performance.

4. How FlexScore supports key stakeholders

Utilities and regulators

- Align performance with distribution needs using scores that summarize assured kW, duration, and shape fit by location. Support performance-based incentives and geo-targeted programs, reduce overpayment risk, and improve trust in non-wires portfolios. (*Illinois DER report, pp. 14-17; Sourcing DER for Distribution Services, pp. 24-32*)

Aggregators and program administrators

- Improve enrollment targeting, set realistic availability commitments, and reduce penalties with early warnings on device health and shape risk. Enable stacking while avoiding double counting. (*Distributed Energy Resources & FERC, pp. 15, 19*)

Insurers and reinsurers

- Underwrite fleet performance risks with standardized metrics; link availability, response, and telemetry assurance to coverage terms. Apply lessons from cyber and AI risk where audits and real-time telemetry improved modeling and lowered loss ratios over time. (*Infosys Journal, pp. 40, 43-50*)

Lenders and asset owners

- Provide consistent, comparable evidence of performance and risk to support project finance and participation in VPP tariffs or programs. (*Hiscox BESS insurance, pp. 2-3; Volta Foundation Battery Report, p. 150*)

5. Integration with today's programs and policies

Performance-based incentives and additive Services

- Illinois recommends annual, call-based incentives for storage tied to avoided distribution costs and measured average kW during events. FlexScore provides a consistent, audit-ready basis for these calculations, reducing overpayment risk. (*Illinois DER report, p. 96*)

Utility and state programs

- Emerging VPP and DER programs require clear enrollment terms, availability signals, and customer compensation clarity (e.g., DC PSC VPP/DERMS pilot; Georgia Power DCL-1/DCO-1; Hawaii BYOD). FlexScore helps standardize the 'performance language' across these constructs. (*50 States of VPPs, pp. 26-28*)

Wholesale market participation

- Under FERC Order 2222 implementation, utilities and RTOs need feasible, non-duplicative services and reliable aggregation. Scores on assured kW, shape fit, and telemetry integrity help avoid double counting and align services across retail and wholesale programs. (*Distributed Energy Resources & FERC*, pp. 14-19)

Federal incentives and finance

- IRA credits (e.g., ITC for storage, 48/48C manufacturing) and DOE LPO Title 17 financing can be paired with performance scoring to scale DER portfolios, especially in energy communities and for tax-exempt entities using elective pay. (*GAO Storage*, p. 26; *DOE 48C*, pp. 1-2; *VP3 flipbook*, p. 68)

6. Method, governance, and data protection

Explainability over black-box

- Scores use traceable inputs (events, metered output, telemetry coverage), with clear formulas and weights. This supports regulator review and aligns with best practice for risk-sensitive applications. (*Infosys Journal*, pp. 48-50)

Reliability screens and continuous validation

- Borrowing from distribution reliability screening, FlexScore tags cost, volumetric, performance, location, and technology maturity risks and updates them as portfolios evolve. (*Sourcing DER for Distribution Services*, pp. 38-41)

Privacy-preserving design

- Telemetry is summarized with integrity checks; no raw customer data sharing is required for underwriting use cases. (*General privacy and compliance principles reflected in Infosys Journal*, pp. 12, 48-50)

7. Insurance, warranties, and bankability

- Mature warranties and availability guarantees for storage (e.g., cycle life, availability) are improving bankability. A fleet score complements device warranties by measuring delivered performance under real dispatch. (*Volta Foundation Battery Report*, p. 150)

- Insurers are scaling capacity for quality BESS risks but emphasize engineering insight; standardized fleet performance data and explainable scores can reduce uncertainty, improve terms, and support long-term coverage. (*Hiscox BESS insurance*, pp. 2-3)

- AI insurance lessons apply: standardized audits and telemetry improved pricing and coverage in cyber markets; similar patterns can evolve for DER performance insurance. (*Infosys Journal*, pp. 40, 43-50)

8. Implementation roadmap

Phase 1: Portfolio baselining

- Establish event definitions, measure historical assured kW, latency, and availability by location and season; produce initial reliability screens. (*Sourcing DER for Distribution Services*, pp. 36-41)

Phase 2: Align incentives and coverage

- Use scores to set performance-based incentive tiers and negotiate insurance endorsements keyed to availability bands and telemetry assurance.

Phase 3: Expand and standardize

- Extend to additional device classes (EV managed charging, heat pumps) and geo-targeted programs; publish standardized score definitions to ease multi-utility adoption and regulator review.

9. KPIs for utilities, regulators, and insurers

- Forecast-to-actual event delivery ratio and response time distributions
- Avoided distribution cost realized vs. incentive spend (by feeder and season)
- Reduction in non-performance penalties and claim frequency/severity for insured fleets
- Enrollment and retention in priority locations, including low- to moderate-income segments

10. Conclusion

DER can deliver reliable, local grid value when compensation, operations, and risk management are coordinated. FlexScore provides the missing translation layer--turning observed behavior into an explainable, underwriting-ready performance score that supports performance-based incentives, strengthens non-wires portfolios, and unlocks innovative insurance and finance. The result: more dependable VPPs, better protection for ratepayers, and faster, fairer electrification.

References

- De Martini, P. *Sourcing DER for Distribution Services* (DOE Distribution Grid Transformation series). pp. 5-7, 13-20, 24-32, 36-43. 2024-12-17.
- *The Value of, and Compensation for, Distributed Energy Resources in Illinois*. pp. 14-17, 27, 31, 67, 76, 96. 2024.
- NARUC, *ADER Fundamentals* (Interactive). pp. 42, 58. September 2018 (citations within

doc updated through 2024).

- VP3 (Virtual Power Plant Partnership) Flipbook v1.1. pp. 22, 65, 68. 2024.
- 50 States of Virtual Power Plants & Supporting DERs: 2024 State Policy Snapshot. pp. 26-28. 2024.
- Distributed Energy Resources and FERC (slides). pp. 14-19. September 18, 2025.
- NREL, Virtual Power Plants and Energy Justice. pp. 17, 19, 35. 2024.
- GAO, Utility-Scale Energy Storage (GAO-23-105583). p. 26. 2023.
- U.S. DOE, Qualifying Advanced Energy Project Credit (48C) Program. pp. 1-2. March 29, 2024; January 10, 2025 allocation updates.
- Hiscox, Powering up grid-scale BESS to bridge the renewables gap. pp. 2-3. 2023/2024.
- Volta Foundation, Battery Report 2024. p. 150. 2024.
- Infosys Knowledge Institute, Global Insurance Journal: Global Economic Risks Navigator. pp. 19-22, 26-27, 32-36, 40, 43-50, 54, 58. 2025.