

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, D.C. 20549

FORM S-8
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

FACTORIAL ENERGY INC.
(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

42-2967285
(I.R.S. Employer
Identification No.)

**805 Middlesex Turnpike
Billerica, MA 01821
(617) 315-9733**
(Address of Principal Executive Offices, Zip Code)

**FACTORIAL ENERGY INC. 2026 EQUITY INCENTIVE PLAN
FACTORIAL ENERGY INC. 2026 EMPLOYEE STOCK PURCHASE PLAN**
(Full title of the plan)

**Siyu Huang
Chief Executive Officer
805 Middlesex Turnpike
Billerica, MA 01821
(617) 315-9733**
(Name and address of agent for service; Telephone number, including area code, of agent for service)

**Copies to:
Jocelyn M. Arel
Jeffrey A. Letalien
Goodwin Procter LLP**

620 Eighth Avenue
New York, NY 10018
(212) 813-8800

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company,” and “emerging growth company” in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☐
		Emerging growth company	☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act. ☐

EXPLANATORY NOTE

On June 5, 2026 (the “Closing Date”), Factorial Energy Inc. (previously named Cartesian Growth Corporation III) (the “Registrant”) consummated a business combination (the “Business Combination”) pursuant to the terms of the business combination agreement, dated December 17, 2025 and amended on March 26, 2026 and May 18, 2026 (as amended, the “Business Combination Agreement”), with Fenway MS, Inc., (“Merger Sub”), and Factorial Inc. (“Legacy Factorial”).

Pursuant to the terms of the Business Combination Agreement, among other things, the following occurred: (1) the domestication of Cartesian Growth Corporation III (“CGC”) as a Delaware corporation, in which CGC de-registered from the Register of Companies in the Cayman Islands and transferred by way of continuation out of the Cayman Islands and into the State of Delaware so as to migrate to and domesticate as a Delaware corporation in accordance with CGC’s amended and restated memorandum and articles of association (the “CGC Articles”), Section 388 of the Delaware General Corporation Law (the “DGCL”) and Part XII of the Cayman Islands Companies Act (As Revised) (the “Domestication”); (2) the merger of Merger Sub with and into Legacy Factorial with Legacy Factorial surviving the merger as a wholly-owned subsidiary of CGC (the “Merger”), in accordance with the Business Combination Agreement and the DGCL; and (3) the consummation of the other transactions contemplated by the Business Combination Agreement and documents related thereto (such transactions, together with the Domestication and the Merger, the “Business Combination”).

In connection with the Business Combination, each outstanding and unexercised option to purchase shares of Legacy Factorial common stock (each, a “Legacy Factorial Option”) under the Factorial Inc. 2019 Stock Incentive Plan (as amended, the “2019 Plan”) was cancelled and exchanged for an option of the Registrant (each, a “Registrant Option”) under the Factorial Energy Inc. 2026 Equity Incentive Plan (the “2026 Plan”) exercisable for the number of shares of the Registrant’s Series A common stock, par value \$0.00001 per share (“Series A Common Stock”) equal to approximately 3.6684 multiplied by the number of shares of Legacy Factorial common stock subject to the Legacy Factorial Option as of immediately prior to the effective time of the Business Combination, rounded down to the nearest whole share. Additionally, each unvested, outstanding restricted stock unit award with respect to Legacy Factorial common stock (each, a “Legacy Factorial RSU”) under the 2019 Plan was cancelled and exchanged for a restricted stock unit award of the Registrant (each, a “Registrant RSU”) under the 2026 Plan relating to the number

of shares of Series A Common Stock set forth on an allocation schedule. Following the Closing Date, Legacy Factorial did not grant any further awards under the 2019 Plan.

Accordingly, this Registration Statement registers (i) 21,000,000 shares of Series A Common Stock reserved and available for future issuance under the 2026 Plan, including (a) 3,115,299 shares of Series A Common Stock issuable with respect to the unvested Legacy Factorial Options that were cancelled and exchanged for Registrant Options under the 2026 Plan, (b) 5,116,217 shares of Series A Common Stock with respect to the unvested Legacy Factorial RSUs that were cancelled and exchanged for Registrant RSUs under the 2026 Plan, and © 12,768,484 shares of Series A Common Stock that have been reserved for future issuance under the 2026 Plan; (ii) 16,524,075 shares of Series A Common Stock issuable with respect to the vested Legacy Factorial Options that were cancelled and exchanged for Registrant Options under the 2026 Plan; and (iii) 1,830,211 shares of Series A Common Stock reserved and available for future issuance under the Factorial Energy Inc. 2026 Employee Stock Purchase Plan.

Part I

INFORMATION REQUIRED IN THE SECTION 10(a) PROSPECTUS

Item 1. Plan Information.

The documents containing the information specified in this Item 1 will be sent or given to participants as specified by Rule 428(b)(1) under the Securities Act of 1933, as amended (the “Securities Act”). In accordance with the rules and regulations of the U.S. Securities and Exchange Commission (the “Commission”) and the instructions to Form S-8, such documents are not being filed with the Commission either as part of this Registration Statement on Form S-8 (this “Registration Statement”) or as prospectuses or prospectus supplements pursuant to Rule 424 under the Securities Act.

Item 2. Registrant Information and Employee Plan Annual Information.

The documents containing the information specified in this Item 2 will be sent or given to participants as specified by Rule 428(b)(1) under the Securities Act. In accordance with the rules and regulations of the Commission and the instructions to Form S-8, such documents are not being filed with the Commission either as part of this Registration Statement or as prospectuses or prospectus supplements pursuant to Rule 424 under the Securities Act.

Part II

INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

Item 3. Incorporation of Documents by Reference.

The Registrant hereby incorporates by reference into this Registration Statement the following documents filed with the Commission:

- (a) The Registrant’s prospectus, dated May 6, 2026, filed with the Commission pursuant to Rule 424(b)(3) of the Securities Act on May 6, 2026, relating to the Registrant’s Registration Statement on Form S-4, as amended (File No. 333-294663), which contains the audited financial statements for the Registrant’s latest fiscal year for which such statements have been filed (the “424(b)(3) Prospectus”);
- (b) Quarterly Report on Form 10-Q for the quarter ended June 30, 2026 filed with the Commission on August 11, 2026;
- (c) Current Reports on Form 8-K filed with the Commission on February 26, 2026, March 10, 2026, March 24, 2026, March 27, 2026, May 11, 2026, May 18, 2026, May 18, 2026, May 28, 2026, June 5, 2026, and June 10, 2026 (excluding information furnished pursuant to Items 2.02 or 7.01, or corresponding information furnished under Item 9.01 or included as an exhibit); and
- (d) The description of the Series A Common Stock contained in the 424(b)(3) Prospectus and any other amendment or report filed for the purpose of updating such description.

All documents that the Registrant subsequently files pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act prior to the filing of a post-effective amendment to this Registration Statement that indicates that all of the shares of Series A Common Stock offered have been sold or that deregisters all of such shares then remaining unsold, shall be deemed to be incorporated by reference in this Registration Statement and to be a part hereof from the date of the filing of such documents.

Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded to the extent that a statement contained herein or in any other subsequently filed document which also is or is deemed to be incorporated by reference herein modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this Registration Statement.

Under no circumstances will any information filed under current items 2.02 or 7.01 of Form 8-K be deemed incorporated herein by reference unless such Form 8-K expressly provides to the contrary.

Item 4. Description of Securities.

Not applicable.

Item 5. Interests of Named Experts and Counsel

Not applicable.

Item 6. Indemnification of Directors and Officers.

Section 145(a) of the Delaware General Corporation Law (the “DGCL”) provides, in general, that a corporation may indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the corporation), because he or she is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys’ fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by the person in connection with such action, suit or proceeding, if he or she acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation and, with respect to any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful.

Section 145(b) of the DGCL provides, in general, that a corporation may indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the corporation to procure a judgment in its favor because the person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys’ fees) actually and reasonably incurred by the person in connection with the defense or settlement of such action or suit if he or she acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, except that no indemnification shall be made with respect to any claim, issue or matter as to which he or she shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in view of all of the circumstances of the case, he or she is fairly and reasonably entitled to indemnity for such expenses that the Court of Chancery or other adjudicating court shall deem proper.

Section 145(g) of the DGCL provides, in general, that a corporation may purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against any liability asserted against such person and incurred by such person in any such capacity, or arising out of his or her status as such, whether or not the corporation would have the power to indemnify the person against such liability under Section 145 of the DGCL.

Our certificate of incorporation, which became effective upon completion of the Business Combination, provides that, to the fullest extent permitted by the DGCL, no director or officer of ours shall be personally liable to us or our stockholders for monetary damages for breach of his or her fiduciary duty as a director or officer, as applicable; provided, however, that, with respect to directors, such limitation of liability does not apply to liability (a) for any breach of the director's duty of loyalty to us or our stockholders, (b) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (c) under Section 174 of the DGCL, or (d) for any transaction from which the director derived an improper personal benefit; and, with respect to officers, such limitation of liability does not apply to liability (a) for any breach of the officer's duty of loyalty to us or our stockholders, (b) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (c) for any transaction from which the officer derived an improper personal benefit, or (d) arising from any claim brought by or in the right of Factorial Energy. Our certificate of incorporation further provides that if the DGCL is amended to authorize corporate action further eliminating or limiting the personal liability of directors or officers, then the liability of a director or officer of ours shall be eliminated or limited to the fullest extent permitted by the DGCL, as so amended.

Our certificate of incorporation further provides that any repeal or modification of such article by its stockholders or amendment to the DGCL will not adversely affect any right or protection existing at the time of such repeal or modification with respect to any acts or omissions occurring before such repeal or modification of a director or officer, as applicable, serving at the time of such repeal or modification.

Our bylaws provide that each of our directors and officers shall be indemnified and held harmless by us to the fullest extent authorized by the DGCL against any and all expenses and liabilities incurred in connection with any proceeding (other than a proceeding by or in the right of us) by reason of such person's corporate status, provided that such director or officer acted in good faith and in a manner reasonably believed to be in or not opposed to the best interests of us and, with respect to any criminal proceeding, had no reasonable cause to believe his or her conduct was unlawful. With respect to proceedings brought by or in the right of us, each director and officer shall be indemnified against expenses incurred in connection therewith, except that no indemnification shall be made in respect of any claim as to which such director or officer shall have been finally adjudged liable to us, unless the Court of Chancery of the State of Delaware or the court in which such proceeding was brought determines that, despite such adjudication of liability, such director or officer is fairly and reasonably entitled to indemnification for such expenses as the court deems proper. Non-officer employees may, in the discretion of our board of directors, be indemnified on similar terms to the fullest extent authorized by the DGCL. Our bylaws further provide that we shall advance all expenses incurred by or on behalf of any director in connection with any proceeding within thirty (30) days after receipt of a written request therefor, subject to an undertaking by such director to repay such amounts if it is ultimately determined that such director is not entitled to indemnification; advancement of expenses to officers and non-officer employees is available at the discretion of our board of directors on similar terms. The rights to indemnification and advancement of expenses provided under our bylaws are deemed contractual in nature, vest at the time of the act or omission in question, and shall not be reduced or eliminated by any subsequent amendment, repeal or modification of our bylaws.

In connection with the Business Combination, we entered into indemnification agreements with each of our directors and executive officers. These agreements provide that we will indemnify each of our directors and such officers to the fullest extent permitted by law and our certificate of incorporation and bylaws.

We also maintain a general liability insurance policy, which will cover certain liabilities of directors and officers of ours arising out of claims based on acts or omissions in their capacities as directors or officers.

Item 7. Exemption from Registration Claimed.

Not applicable.

Item 8. Exhibits.

EXHIBIT INDEX

Exhibit No.	Description
4.1	Factorial Energy Inc. Certificate of Incorporation (incorporated by reference to the Registrant's Current Report on Form 8-K filed on June 10, 2026).
4.2	Factorial Energy Inc. Bylaws (incorporated by reference to the Registrant's Current Report on Form 8-K filed on June 10, 2026).
5.1	Opinion of Goodwin Procter LLP.
23.1	Consent of RSM US LLP, independent registered public accounting firm.
23.2	Consent of CBIZ CPAs P.C., former independent registered public accounting firm.
23.3	Consent of Goodwin Procter LLP (included in Exhibit 5.1).
24.1	Power of Attorney (included on signature page).
99.1	2026 Equity Incentive Plan of Factorial Energy Inc., and forms of award agreements thereunder (incorporated by reference to Exhibit 10.17 to the Registrant's Current Report on Form 8-K filed on June 10, 2026).
99.2	2026 Employee Stock Purchase Plan of Factorial Energy Inc. (incorporated by reference to Exhibit 10.18 to the Registrant's Current Report on Form 8-K filed on June 10, 2026).
107	Filing Fee table.

Item 9. Undertakings.

(a) The Registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this Registration Statement:

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act.

(ii) To reflect in the prospectus any facts or events arising after the effective date of the Registration Statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the Registration Statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20% change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the Registration Statement.

(iii) To include any material information with respect to the plan of distribution not previously disclosed in the Registration Statement or any material change to such information in the registration statement. *Provided, however,*

that paragraphs (a)(1)(i) and (a)(1)(ii) herein do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the Registrant pursuant to Section 13 or Section 15(d) of the Exchange Act (15 U.S.C. 78m or 78o(d)) that are incorporated by reference in the Registration Statement.

(2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered herein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(b) The undersigned Registrant hereby undertakes that, for purposes of determining any liability under the Securities Act, each filing of the Registrant's annual report pursuant to Section 13(a) or Section 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Exchange Act) that is incorporated by reference in the Registration Statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(h) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in Billerica, Massachusetts, on this 12th day of August, 2026.

FACTORIAL ENERGY INC.

By: /s/ Siyu Huang
Name: Siyu Huang
Title: Chief Executive Officer

POWER OF ATTORNEY AND SIGNATURES

KNOW ALL BY THESE PRESENT, that each individual whose signature appears below hereby constitutes and appoints each of Siyu Huang and Richard Wei, as such person’s true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for such person in such person’s name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this Registration Statement, and to file the same, with all exhibits thereto, and all documents in connection therewith, with the Commission granting unto each said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as such person might or could do in person, hereby ratifying and confirming all that any said attorney-in-fact and agent, or any substitute or substitutes of any of them, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act, this Registration Statement has been signed by the following person in the capacities and on the date indicated.

NAME	TITLE	DATE
/s/ Siyu Huang Siyu Huang	Chief Executive Officer and Director <i>(Principal Executive Officer)</i>	August 12, 2026
/s/ Richard Wei Richard Wei	Chief Financial Officer <i>(Principal Financial Officer)</i>	August 12, 2026
/s/ Jay Scuteri Jay Scuteri	VP, Finance <i>(Principal Accounting Officer)</i>	August 12, 2026
/s/ Alex Yu Alex Yu	Co-Founder, Chief Technical Officer and Director	August 12, 2026
/s/ Joseph M. Taylor Joseph M. Taylor	Executive Chairperson	August 12, 2026
/s/ Uwe Keller Uwe Keller	Director	August 12, 2026
/s/ Liad Meidar Liad Meidar	Director	August 12, 2026
/s/ Jon K. Nelson Jon K. Nelson	Director	August 12, 2026
/s/ Dieter Zetsche Dieter Zetsche	Director	August 12, 2026

Calculation of Filing Fee Tables

S-8

Factorial Energy Inc.

Table 1: Newly Registered Securities

	Security Type	Security Class Title	Fee Calculation Rule	Amount Registered	Proposed Maximum Offering Price Per Unit	Maximum Aggregate Offering Price	Fee Rate	Amount of Registration Fee
1	Equity	Series A common stock, par value \$0.00001 per share	Other	12,768,484	\$ 5.83	\$ 74,440,261.72	0.0001381	\$ 10,280.20
2	Equity	Series A common stock, par value \$0.00001 per share	Other	3,115,299	\$ 1.07	\$ 3,333,369.93	0.0001381	\$ 460.34
3	Equity	Series A common stock, par value \$0.00001 per share	Other	5,116,217	\$ 5.83	\$ 29,827,545.11	0.0001381	\$ 4,119.18
4	Equity	Series A common stock, par value \$0.00001 per share	Other	16,524,075	\$ 1.07	\$ 17,680,760.25	0.0001381	\$ 2,441.71
5	Equity	Series A common stock, par value \$0.00001 per share	Other	1,830,211	\$ 5.83	\$ 10,670,130.13	0.0001381	\$ 1,473.54
Total Offering Amounts:						\$ 135,952,067.14		\$ 18,774.97
Total Fee Offsets:								\$ 0.00
Net Fee Due:								\$ 18,774.97

Offering Note

1

(a) On June 5, 2026 (the "Closing Date"), Factorial Energy Inc. (previously named Cartesian Growth Corporation III, the "Registrant") consummated a business combination (the "Business Combination") pursuant to the terms of the business combination agreement, dated December 17, 2025 and amended on March 26, 2026 and May 18, 2026, with Fenway MS, Inc., ("Merger Sub"), and Factorial Inc. ("Legacy Factorial"). Pursuant to Rule 416, under the Securities Act of 1933, as amended (the "Securities Act"), this Registration Statement on Form S-8 ("Registration Statement") shall also cover any additional shares of Series A common stock, \$0.00001 per value per share (the "Series A Common Stock") of the Registrant that become issuable under the Factorial Energy Inc. 2026 Equity Incentive Plan (the "2026 Plan") and the Factorial Energy Inc. 2026 Employee Stock Purchase Plan (the "2026 ESPP") by reason of any stock dividend, stock split, recapitalization or any other similar transactions.

(b) Represents 12,768,484 shares of Series A Common Stock reserved and available for future issuance under the 2026 Plan. To the extent outstanding equity awards granted under the 2026 Plan are cancelled, forfeited, or otherwise terminated without being exercised, the number of shares underlying such awards will be available for future grant under the 2026 Plan. The 2026 Plan provides

that the number of shares reserved and available for issuance thereunder will automatically increase on January 1, 2027 and each January 1 thereafter by (i) 5% of the sum of Outstanding Shares (as defined in the 2026 Plan) on the immediately preceding December 31 or (ii) such lesser number of shares as determined by the administrator of the 2026 Plan.

(c) Estimated solely for the purposes of calculating the registration fee pursuant to rule 457(c) of the Securities Act, and based on \$5.83, the average of the high and low sales prices of the Series A Common Stock as reported on the Nasdaq Stock Market ("Nasdaq") on August 10, 2026 (such date being within five business days of the date that this Registration Statement was filed with the Securities and Exchange Commission ("Commission")).

2

(a) See note 1(a).

(b) Represents 3,115,299 shares of Series A Common Stock issuable with respect to the unvested options to purchase shares of Legacy Factorial common stock (each, a "Legacy Factorial Option") under the Factorial Inc. 2019 Stock Incentive Plan (as amended, the "2019 Plan") that were cancelled and exchanged for stock option awards of the Registrant (each, a "Registrant Option") under the 2019 Plan. Following the Closing Date, Legacy Factorial did not grant any further awards under the 2019 Plan. To the extent outstanding options granted under the 2026 Plan are cancelled, forfeited or otherwise terminated without being exercised, the number of shares underlying such awards will be available for future grant under the 2026 Plan.

(c) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(h) of the Securities Act, and based on \$1.07, which is the weighted average exercise price (rounded to the nearest cent) of such Registrant Options.

3

(a) See note 1(a).

(b) Represents 5,116,217 shares of Series A Common Stock issuable pursuant to the unvested restricted stock unit awards with respect to shares of Legacy Factorial common stock (each, a "Legacy Factorial RSU") under the 2019 Plan that were cancelled and exchanged for restricted stock unit awards of the Registrant (each, a Registrant RSU") under the 2026 Plan. Following the Closing Date, Legacy Factorial did not grant any further awards under the 2019 Plan. To the extent outstanding restricted stock unit awards granted under the 2026 Plan are cancelled, forfeited or otherwise terminated without being settled, the number of shares underlying such awards will be available for future grant under the 2026 Plan.

(c) Estimated solely for the purpose of calculating the registration fee pursuant to rule 457(c) of the Securities Act, and based on \$5.83, the average of the high and low sales prices of the Series A Common Stock as reported on Nasdaq on August 10, 2026 (such date being within five business days of the date that this Registration Statement was filed with the Commission).

4

(a) see note 1(a).

(b) Represents 16,524,075 shares of Series A Common Stock issuable with respect to the vested Legacy Factorial Options that were cancelled and exchanged for Registrant Options under the 2026 Plan. Following the Closing Date, Legacy Factorial, did not grant any further awards under the 2019 Plan. To the extent outstanding options granted under the 2026 Plan are cancelled, forfeited or otherwise terminated without being exercised, the number of shares underlying such awards will be available for future grant under the 2026 plan.

(c) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(h) of the Securities Act, and based on \$1.07, which is the weighted average exercise price (rounded to the nearest cent) of such Registrant Options.

5

(a) See note 1(a).

(b) Represents 1,830,211 shares of Series A Common Stock reserved and available for future issuance under the 2026 ESPP. The 2026 ESPP provides that the number of shares reserved and available for issuance thereunder automatically increases each January 1, beginning January 1, 2027 and ending on January 1, 2036, by the lesser of (i) 2% of the Registrant's Outstanding Shares (as defined in the 2026 ESPP) on the immediately preceding December 31, (ii) 3,000,000 shares of Series A Common Stock and (iii) such number of shares of Series A Common Stock as determined by the administrator of the

(c) Estimated solely for the purposes of calculating the registration fee pursuant to Rule 457(c) of the Securities Act, and based on 85% (the percentage of the price per share applicable to purchases under the 2026 ESPP) of \$5.83, the average of the high and low sale prices of the Series A Common Stock as reported on Nasdaq on August 10, 2021⁶ (such date being within five business days of the date that this Registration Statement was filed with the Commission).

☒ Not Applicable[illegible]

August 12, 2026

Factorial Energy Inc.
805 Middlesex Turnpike
Billerica, MA 01821

Re: Securities Being Registered under Registration Statement on Form S-8

We have acted as your counsel in connection with your filing of a Registration Statement on Form S-8 (the “Registration Statement”) pursuant to the Securities Act of 1933, as amended (the “Securities Act”), on or about the date hereof relating to an aggregate of 39,354,286 shares (the “Shares”) of Series A Common Stock, par value \$0.00001 per share (“Series A Common Stock”), of Factorial Energy Inc., a Delaware corporation (the “Company”), that may be issued pursuant to the Factorial Energy Inc. 2026 Equity Incentive Plan and the Factorial Energy Inc. 2026 Employee Stock Purchase Plan (collectively, the “Plans”).

We have reviewed such documents and made such examination of law as we have deemed appropriate to give the opinion set forth below. We have relied, without independent verification, on certificates of public officials and, as to matters of fact material to the opinion set forth below, on certificates of officers of the Company.

For purposes of the opinion set forth below, we have assumed that, at the time Shares are issued, the total number of then unissued Shares, when added to the number of shares of Series A Common Stock issued, subscribed for, or otherwise committed to be issued, does not exceed the number of shares of Series A Common Stock authorized by the Company’s certificate of incorporation.

The opinion set forth below is limited to the Delaware General Corporation Law.

Based on the foregoing, we are of the opinion that the Shares have been duly authorized and, when delivered against payment therefor in accordance with the terms of the Plans, will be validly issued, fully paid and nonassessable.

This opinion letter and the opinion it contains shall be interpreted in accordance with the Core Opinion Principles as published in 74 *Business Lawyer* 815 (Summer 2019).

We hereby consent to the inclusion of this opinion as Exhibit 5.1 to the Registration Statement. In giving our consent, we do not admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations thereunder.

Very truly yours,

/s/ GOODWIN PROCTER LLP

GOODWIN PROCTER LLP

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in this Registration Statement on Form S-8 of Factorial Energy Inc. of our report dated March 26, 2026, relating to the consolidated financial statements of Factorial Inc. as of and for the years ended December 31, 2025 and 2024, appearing in the Registration Statement (No. 333-294663) on Form S-4, as amended, and related Prospectus of Factorial Energy Inc. (previously named Cartesian Growth Corporation III).

/s/ RSM US LLP

Boston, Massachusetts
August 12, 2026

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in this Registration Statement on Form S-8 of our report dated March 20, 2026 with respect to the financial statements of Cartesian Growth Corporation III for the year ended December 31, 2025 included in the Annual Report on Form 10-K.

/s/ CBIZ CPAs P.C.

Houston, Texas
August 12, 2026