

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

FORM S-8

REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933

CALPINE CORPORATION

(Exact Name of Registrant as specified in its charter)

Delaware

(State or other jurisdiction of incorporation or organization)

77-0212977

(I.R.S. Employer Identification No.)

**717 Texas Avenue
Houston, Texas 77002**

(Address of principal executive offices and zip code)

**Calpine Corporation 2008 Director Incentive Plan
Calpine Corporation 2008 Equity Incentive Plan**
(Full title of the Plan)

W. Thaddeus Miller, Esq.**Executive Vice President, Chief Legal Officer and Secretary**

**Calpine Corporation
717 Texas Avenue, Suite 1000
Houston, Texas 77002
(713) 830-8775**

(Name, Address, Including Zip Code, and Telephone Number, Including Area Code, of Agent for Service)

Copies of communications to:

**Michael Shenberg, Esq.
Colin J. Diamond, Esq.
White & Case LLP
1155 Avenue of the Americas
New York, New York
Tel: (212) 819-8200**

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See definitions of "large accelerated filer," "accelerated filer," and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ☒ [X]Non-accelerated filer ☐ []

(Do not check if a smaller reporting company)

Accelerated filer ☐ []Smaller reporting company ☐ []**CALCULATION OF REGISTRATION FEE**

Title of Securities Being Registered	Amount to be Registered (1)	Proposed Maximum Offering Price Per Share (2)	Proposed Maximum Aggregate Offering Price (2)	Amount of Registration Fee
Common Stock, \$.001 par value per share	400,000 shares (3)	13.76	\$5,504,000	\$392.44
Common Stock, \$.001 par value per share	12,700,000 shares (4)	13.76	\$174,752,000	\$12,459.82

(1) Pursuant to Rule 416 under the Securities Act of 1933, as amended, this Registration Statement shall also cover any additional shares of Common Stock which become issuable under the above-named plans by reason of any stock dividend, stock split, recapitalization or other similar transaction effected without the receipt of consideration which results in an increase in the number of outstanding shares of Common Stock.

- (2) Estimated pursuant to Rules 457(c) and (h) under the Securities Act solely for purposes of calculating the amount of the registration fee, on the basis of the average high and low trading prices of the Registrant's common stock on May 18, 2010, as reported on the New York Stock Exchange, which was \$13.76 per share.
 - (3) Represents 400,000 additional shares issuable under the Calpine Corporation 2008 Director Incentive Plan.
 - (4) Represents 12,700,000 additional shares issuable under the Calpine Corporation 2008 Equity Incentive Plan.
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EXPLANATORY NOTE

Calpine Corporation (the “Registrant”) previously filed a registration statement on Form S-8 (File No. File No. 333-149074) (the “Initial Registration Statement”) on February 6, 2008, registering 167,000 shares issuable under the Calpine Corporation 2008 Director Incentive Plan (the “Director Plan”) and 14,833,000 shares issuable under the Calpine Corporation 2008 Equity Incentive Plan (the “Equity Plan”). On February 25, 2010, the Board of Directors of the Registrant adopted, subject to the approval of the Registrant’s stockholders, an amendment to the Director Plan to increase the aggregate number of shares of common stock authorized for issuance under the Director Plan by 400,000 and an amendment to the Equity Plan to increase the aggregate number of shares of common stock authorized for issuance under the Equity Plan by 12,700,000 (collectively, the “Amendments”). On May 19, 2010, the Registrant’s stockholders approved the Amendments.

The purpose of this Registration Statement on Form S-8 (this “Registration Statement”) is for the Registrant to register an additional 400,000 shares issuable under the Director Plan and an additional 12,700,000 shares issuable under the Equity Plan.

In accordance with General Instruction E of Form S-8, the contents of the Initial Registration Statement are incorporated herein by reference and the information required by Part II is omitted, except as supplemented by the information set forth below.

PART I

INFORMATION REQUIRED IN THE SECTION 10(A) PROSPECTUS

Item 1. Plan Information*

Item 2. Registrant Information and Employee Plan Annual Information*

*As permitted by Rule 428 under the Securities Act, this Registration Statement omits the information specified in Part I of Form S-8. The documents containing the information specified in Part I will be delivered to the participants in the plan covered by this Registration Statement as required by Rule 428(b). Such documents are not being filed with the Commission as part of this Registration Statement or as prospectuses or prospectus supplements pursuant to Rule 424 under the Securities Act. These documents and the documents incorporated by reference in this Registration Statement pursuant to Item 3 of Part II hereof, taken together, constitute a prospectus that meets the requirements of Section 10(a) of the Securities Act. The Registrant will provide a written statement to participants advising them of the availability without charge, upon written or oral request, of the documents incorporated by reference in Item 3 of Part II hereof and including the statement in the preceding sentence. The written statement to all participants will indicate the availability without charge, upon written or oral request, of other documents required to be delivered pursuant to Rule 428(b), and will include the address and telephone number to which the request is to be directed.

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 previously filed with the SEC:

- (a) the Registrant’s Annual Report on Form 10-K for the fiscal year ended December 31, 2009, filed on February 25, 2010 and the portions of the Registrant’s Proxy Statement on Schedule 14A filed on April 5, 2010 and incorporated by reference into such Annual Report;
- (b) the Registrant’s Quarterly Report on Form 10-Q for the fiscal quarter ended March 31, 2010, filed on May 5, 2010;
- (c) the Registrant’s Current Reports on Form 8-K filed on April 5, 2010, April 21, 2010 (Item 1.01 only), May 5, 2010 (Item 5.02 only), May 17, 2010 (Item 8.01 only) and May 21, 2010; and

(d) the description of the Company's Common Stock, par value \$0.001 per share, set forth in its Registration Statement on Form 8-A filed on January 15, 2008.

In addition, all of the Registrant's reports filed with the Commission pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), after the date of this Registration Statement and prior to filing a post-effective amendment which indicates that all securities offered hereby have been sold or which deregisters all securities 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 filing of such reports.

Any statement contained herein or in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this Registration Statement to the extent that a statement contained in any 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.

Item 8. Exhibits

The exhibits listed on the exhibit index at the end of this Registration Statement are included in this Registration Statement.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, 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 the City of Houston, State of Texas, on May 21, 2010.

CALPINE CORPORATION

By: /s/ JACK A. FUSCO

Name: Jack A. Fusco

Title: President, Chief Executive Officer and Director

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Jack A. Fusco and W. Thaddeus Miller, each of them acting individually, his or her true and lawful attorney-in-fact and agent, each with full power of substitution and revocation, in his or her name and on his or her behalf, to do any and all acts and things and execute, in the name of the undersigned, any and all instruments which said attorney-in-fact and agent may deem necessary or advisable to enable the Company to comply with the Securities Act, and any rules, regulations, or requirements of the Securities and Exchange Commission in respect thereof, in connection with the filing with the Securities and Exchange Commission of this registration statement on Form S-8 under the Securities Act, including specifically but without limitation, power and authority to sign the name of the undersigned to such registration statement, and any amendments to such registration statement (including post-effective amendments), and to file the same with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission and any applicable securities exchange or securities regulatory body, to sign any and all applications, registration statements, notices or other documents necessary or advisable to comply with applicable securities laws, including without limitation state securities laws, and to file the same, together with other documents in connection therewith with the appropriate authorities, including without limitation state securities authorities, granting unto said attorney-in-fact and agent, full power and authority to do and to perform each and every act and thing requisite or necessary to be done in and about the premises, as fully and to all intents and purposes as the undersigned might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or his substitute, may lawfully do or cause to be done by virtue hereof. This Power of Attorney may be signed in several counterparts.

Pursuant to the requirements of the Securities Act of 1933, this Registration Statement has been signed by the following persons in the capacities indicated on May 21, 2010:

Signature

Title of Capacities

/s/ JACK A. FUSCO

Jack A. Fusco

President, Chief Executive Officer and Director
(Principal Executive Officer)

/s/ ZAMIR RAUF

Zamir Rauf

Executive Vice President and Chief Financial
Officer (Principal Financial Officer)

/s/ KENNETH GRAVES

Kenneth Graves

VP and Interim Chief Accounting
Officer (Principal Accounting Officer)

/s/ WILLIAM J. PATTERSON

William J. Patterson

Chairman of the Board of Directors

/s/ FRANK CASSIDY

Frank Cassidy

Director

/s/ ROBERT C. HINCKLEY

Robert C. Hinckley

Director

/s/ DAVID C. MERRITT

David C. Merritt

Director

/s/ W. BENJAMIN MORELAND

W. Benjamin Moreland

Director

/s/ ROBERT A. MOSBACHER, JR.

Robert A. Mosbacher, Jr.

Director

/s/ DENISE M. O'LEARY

Denise M. O'Leary

Director

/s/ J. STUART RYAN

J. Stuart Ryan

Director

EXHIBITS

Number	Description
5.1	Opinion of White & Case LLP, counsel to the Registrant, as to the validity of the ordinary shares (including consent)*
23.1	Consent of PricewaterhouseCoopers LLP*
23.2	Consent of PricewaterhouseCoopers LLP*
23.3	Consent of White & Case LLP (included in Exhibit 5.1)
24.1	Power of Attorney (contained on the signature page to this Registration Statement)
99.1	Calpine Corporation Amended and Restated 2008 Director Incentive Plan (incorporated by reference to Annex A to the Registrant's Proxy Statement on Schedule 14A filed on April 5, 2010)
99.2	Calpine Corporation Amended and Restated 2008 Equity Incentive Plan (incorporated by reference to Annex B to the Registrant's Proxy Statement on Schedule 14A filed on April 5, 2010)

* Filed herewith

WHITE & CASE

White & Case LLP
 1155 Avenue of the Americas
 New York, New York 10036-2787

Tel + 1 212 819 8200
 Fax + 1 212 354 8113
 www.whitecase.com

May 21, 2010

Calpine Corporation
 717 Texas Avenue, Suite 1000
 Houston, Texas 77002

Re: 400,000 Shares of Common Stock reserved for issuance pursuant to the Calpine Corporation 2008 Director Incentive Plan, as amended, and 12,700,000 Shares of Common Stock reserved for issuance pursuant to the Calpine Corporation 2008 Equity Incentive Plan, as amended and restated

Ladies and Gentlemen:

We are familiar with the proceedings taken and proposed to be taken by Calpine Corporation, a Delaware corporation (the "Company"), in connection with the registration pursuant to the Registration Statement on Form S-8 (the "Registration Statement") to be filed by the Company with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), of 400,000 shares of its Common Stock, \$.001 par value, reserved for issuance under the Calpine Corporation 2008 Director Incentive Plan, as amended (the "Director Plan") and of 12,700,000 shares of its Common Stock, \$.001 par value, reserved for issuance under the Calpine Corporation 2008 Equity Incentive Plan, as amended (the "Equity Plan").

We have examined such documents, certificates, records, authorizations and proceedings and have made such investigations as we have deemed necessary or appropriate in order to give the opinion expressed herein.

Based on the foregoing, it is our opinion that the above-referenced 400,000 shares of Common Stock reserved for issuance under the Director Plan and 12,700,000 shares of Common Stock reserved for issuance under the Equity Plan have been duly authorized by the Company and, when issued as provided under the Director Plan and the Equity Plan, respectively, will be validly issued, fully paid and nonassessable shares of Common Stock of the Company.

ABU DHABI ALMATY ANKARA BEIJING BERLIN BRATISLAVA BRUSSELS BUCHAREST BUDAPEST DOHA DÜSSELDORF FRANKFURT
 GENEVA HAMBURG HELSINKI HONG KONG ISTANBUL JOHANNESBURG LONDON LOS ANGELES MEXICO CITY MIAMI MOSCOW MUNICH
 NEW YORK PALO ALTO PARIS PRAGUE RIYADH SÃO PAULO SHANGHAI SINGAPORE STOCKHOLM TOKYO WARSAW WASHINGTON, DC

We do not express or purport to express any opinions with respect to laws other than the General Corporation Law of the State of Delaware, including the applicable provisions of the Delaware Constitution and reported judicial decisions interpreting such Law.

We do not undertake to advise you of any changes in our opinion expressed herein resulting from matters that may arise after the date of this letter or that hereinafter may be brought to our attention. We hereby consent to the filing of this opinion as an exhibit to the above-referenced Registration Statement. In giving this consent, we do not hereby admit that we are within the category of persons whose consent is required under Section 7 of the Securities Act and the rules and regulations of the Commission thereunder.

Very truly yours,

/s/ White & Case LLP

CJD:iY

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Registration Statement on Form S-8 of our report dated February 24, 2010 relating to the financial statements, financial statement schedule and the effectiveness of internal control over financial reporting, which appears in Calpine Corporation's Annual Report on Form 10-K for the year ended December 31, 2009.

/s/ PricewaterhouseCoopers LLP
Houston, Texas
May 21, 2010

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Registration Statement on Form S-8 of Calpine Corporation of our report dated February 24, 2010 relating to the financial statements of Otay Mesa Energy Center, LLC, which appears in Calpine Corporation's Annual Report on Form 10-K for the year ended December 31, 2009.

/s/ PricewaterhouseCoopers LLP
Houston, Texas
May 21, 2010