



**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

FILED

12-15-09
04:59 PM

Order Instituting Rulemaking Regarding
Policies, Procedures and Rules for the
California Solar Initiative, the Self-
Generation Incentive Program and Other
Distributed Generation Issues.

R.08-03-008
(Filed March 13, 2008)

**COMMENTS OF THE CALIFORNIA CLEAN DG COALITION
ON THE IMPLEMENTATION OF SENATE BILL 412**

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December 15, 2009

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OF THE STATE OF CALIFORNIA**

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In accordance with the November 13, 2009 Administrative Law Judge’s (“ALJ”) Ruling Requesting Comments on the Implementation of Senate Bill (“SB”) 412 and Noticing Workshop (“ALJ’s Ruling”), the California Clean DG Coalition (“CCDC”) files these comments.¹

Question 1. How do the new program requirements in SB 412 impact the existing SGIP? Should SGIP continue to offer technology differentiated incentives, or should the program consider a single incentive structure based on reductions in greenhouse gas emissions? What process should the Commission and CARB use to determine whether technologies meet the greenhouse gas emissions reduction requirement in SB 412?

The Self-Generation Incentive Program (“SGIP”) was originally conceived as a peak load reduction program in response to the California energy crisis of 2000-2001. It has evolved over time to include inducements for fledgling technologies. As noted in the ALJ’s Ruling, beginning January 1, 2008, by law, SGIP incentives have been available only to wind and fuel cell technologies. In recent years, climate change has emerged as a critical global issue. Through the enactment of SB 412 (Stats. 2009, Ch. 182), which once again allows SGIP funds for combustion-based distributed generation, including combined heat and power (“CHP”), that meets specified efficiency and emissions requirements, the Legislature aligned the SGIP with its carbon reduction goals and policies as set forth in California’s Global Warming Solutions Act of

¹ CCDC is an ad hoc group interested in promoting the ability of distributed generation (“DG”) system manufacturers, distributors, marketers and investors, and electric customers, to deploy DG. Its members represent a variety of DG technologies including CHP, renewables, gas turbines, microturbines, reciprocating engines, and microengines. CCDC is currently comprised of Capstone Turbine Corporation, Cummins Inc., DE Solutions, EPS Corporation, Hawthorne Power Systems, Holt of California, Peterson Power Systems, RealEnergy, LLC, SDP Energy, Solar Turbines Incorporated, and Tecogen, Inc.

2006. In order to ensure that the new program requirements in SB 412 are properly integrated into the existing SGIP, CCDC recommends:

1. Consistent with SB 412, SGIP's focus must be linked to achieving greenhouse gas ("GHG") emission reductions.
2. In the California Air Resources Board's ("CARB") Climate Change Scoping Plan, CARB recognized the potential for efficient CHP to contribute to GHG reductions. CARB set a target of 4,000 MW additional installed CHP capacity by 2020, with the goal of displacing approximately 30,000 GWhs of demand from other power generation sources.² To capture the greatest GHG reductions in furtherance of CARB's target of 4,000 MW of new CHP, and to promote consistency and fairness among commercially established and competing CHP technologies, SGIP incentives generally should apply to combustion systems without regard to technology type. However, as market contributions are required across the whole size spectrum to realize CARB's goals, CCDC recognizes that higher incentives are needed for smaller kW systems (generally less than 500 kW), since their installed costs (\$/kW) are higher than the costs for larger systems. CCDC also supports extending SGIP eligibility to larger CHP systems, in recognition of the important contributions larger CHP systems can make toward meeting the CARB goals.

Renewable SGIP-eligible systems (*e.g.*, digester gas, biomass, landfill gas systems) should be treated separately and receive higher incentives because of higher fuel clean-up and operation and maintenance costs compared to natural gas-fired systems. CCDC further recommends that in determining emissions eligibility requirements for renewable systems, the Commission refer to CARB's NO_x guidelines.

3. CCDC suggests that the Commission and CARB oversee a workshop process, including written comments as appropriate, to determine whether technologies meet the GHG emissions reduction requirement in SB 412, and thus should be eligible for SGIP incentives. Additionally, to facilitate the expeditious installation and operation of CHP systems to help meet the goals of the Global Warming Solutions Act and SB 412, CCDC requests that the Commission's decision on the implementation of SB 412 be applied

² Climate Change Scoping Plan (CARB, December 2008), pp. 43-44 (the Climate Change Scoping Plan is available on CARB's web site: http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf).

retroactively to January 1, 2010. This will make it possible for CHP developers to market CHP solutions in anticipation of incentives being made available, thereby addressing some of the lead time issues associated with developing, financing, and permitting a CHP system.

4. CHP systems that are eligible for SGIP should also be allowed to sell excess energy to the investor owned utilities pursuant to any contracts and tariffs adopted to implement AB 1613 which, like SB 412, also ks to promote efficient CHP to reduce GHG emissions.

Question 2. Given SB 412, what new technologies should be considered for SGIP eligibility?

CCDC recommends that combustion-based prime movers meeting applicable performance eligibility criteria, per SB 412, be eligible for SGIP incentives. Such prime movers include gas turbines, microengines, microturbines, and engines. Each of these technologies were eligible for SGIP from its inception through 2007. CCDC also recommends that consideration be given to steam turbines as an eligible technology, even though they were not previously eligible for SGIP. Additional detail regarding CCDC’s recommendations is provided in Attachment A hereto.

Question 3. What additional program modifications, if any, should be made to the SGIP in light of SB 412? Specifically, how should the Commission consider other public policy interests besides greenhouse gas emissions reductions in implementing SGIP? Public Utilities Code Section 379.6(e) authorizes the Commission, in administering SGIP, to “evaluate other public policy interests, including, but not limited to, ratepayers, and energy efficiency, peak load reduction, load management and environmental interests.” In an effort to align the incentives with these policy objectives, should the SGIP consider performance based incentives, where projects are paid incentives based on actual production as opposed to an up-front capacity-based incentive?

CCDC’s members have participated in the development and implementation by the United States Department of Energy and many states of policies and initiatives encouraging CHP. The unifying principle underlying federal and state policy is that *GHG reduction is but one of many attributes of CHP*. For example, the Oak Ridge National Laboratory found that by generating 20% of its electricity from CHP, the United States could achieve the following results:

- Reduce CO2 emissions by 800 million metric tons, equal to the CO2 savings from removing 154 million cars from the road;
- Reduce energy usage by 5.3 quadrillion BTUs annually, the equivalent of half of all U.S. residential energy usage;
- Generate \$234 billion in new investments; and
- Create a million jobs.³

In addition to revising SGIP to provide that combustion technologies that meet applicable efficiency and emissions requirements are eligible for SGIP incentives, CCDC recommends that the Commission not adopt performance incentives based on actual energy production. Such an approach does not accurately account for the benefits of CHP. Improved efficiency and emissions reductions are the sine qua non of SB 412; production is a byproduct. CCDC recommends that the parameters for incentives designed to promote energy efficiency and GHG reductions be discussed at the upcoming workshop.⁴

Question 4. In light of the January 2016 sunset date for SGIP in SB 412, how should SGIP prepare to wind down? Should SGIP consider implementing a declining incentive structure to facilitate the transformation of DG markets so that DG technologies do not continue to rely on incentives beyond 2016? How might this declining incentive structure be designed?

In its original form, the primary goal of SGIP was peak demand reduction. Assuming that eligible technologies would improve over time with decreasing installed costs, the Commission instituted declining SGIP incentives. The thrust of SB 412 is GHG emissions reductions, an entirely different paradigm than peak load reduction. As discussed in our response to Question 3, the known benefits of CHP, including the potential for GHG emissions reductions, are compelling. Yet, increasing market penetration and achieving CARB’s target for increased installations of CHP are not assured in today’s regulatory environment. Given the shift in emphasis called for by SB 412, and regulatory and market uncertainties, CCDC believes it is premature to adopt at this time a declining incentive structure. Instead, the Commission should now focus on making the SGIP modifications allowed by SB 412. As those modifications are

³ Combined Heat and Power – Effective Energy Solutions for a Sustainable Future (Oak Ridge National Laboratory, December 2008), pp. 3-4 (the report is available at: http://www1.eere.energy.gov/industry/distributedenergy/pdfs/chp_report_12-08.pdf). See also Combined Heat and Power, A Decade of Progress, A Vision for the Future (US DOE, August 2009) (the report is available at: http://www1.eere.energy.gov/industry/distributedenergy/pdfs/chp_accomplishments_booklet.pdf.)

⁴ See also discussion regarding incentives in Attachment A hereto.

implemented, the Commission should gather the information required to determine how to wind SGIP down, *or* to support an extension of SGIP – if accumulated data shows potential for further GHG emission reductions, for example. In two to three years, the Commission could evaluate this SGIP information and develop an appropriate program plan through 2016.

The following reasons also support deferring adoption of a declining incentive structure:

- It is not clear that rising electricity rates will make distributed generation more affordable on a competitive basis because natural gas price volatility can offset the savings margin.
- Natural gas-powered distributed generation may have to bear the added costs of a carbon adder after 2016, depending on the Cap and Trade Program regulations ultimately adopted by CARB. Also, it is unclear whether there will be additional requirements and costs under a federal cap and trade program.
- The California Energy Commission’s CHP Market Assessment found that even with an SGIP that is expanded to include combustion technologies, California will not reach the 4,000 MW CHP target in CARB’s Climate Change Scoping Plan without the adoption of additional measures.⁵

CHP 2029 Capacity MW	Base	CO₂ Payment	Restore SGIP	Expanded Export	All In
On-Site	2,427	2,658	2,866	2,427	3,095
Export	304	304	316	1,745	3,100
Air Conditioning	267	281	314	267	325
Total	2,998	3,242	3,496	4,439	6,519

- Distributed generation, including CHP, is not typical practice among energy consumers, especially those in the commercial and institutional sectors. Increasing customer awareness of and confidence in CHP and removal of regulatory barriers are ongoing endeavors undertaken by federal and state agencies, and industry. Incentives and other means of government support are critical to transform the market and make CHP a mainstream tool to achieve GHG reduction goals.

⁵ CHP Market Assessment, Draft Consultant Report (CEC, October 2009), pp. 82-83; Table 42 (the report is available on the CEC’s web site: <http://www.energy.ca.gov/2009publications/CEC-500-2009-094/CEC-500-2009-094-D.PDF>.)

Based on the foregoing, CCDC recommends a “wait and see” position and strongly advises against adopting a declining incentive structure at this time. The Commission could undertake an SGIP analysis and consider the current 2016 SGIP end date in two to three years.

Conclusion

CCDC appreciates the Commission’s consideration of these comments and looks forward to working with all stakeholders to expeditiously implement SB 412.

DATED: December 15, 2009

DAY CARTER & MURPHY LLP

By: Ann L. Trowbridge /s/
Ann L. Trowbridge

ATTACHMENT A

SGIP NEW TECHNOLOGY ELIGIBILITY PROPOSAL

1. Detailed System Description

CCDC proposes that the Commission find that the following technologies are eligible for SGIP incentives, consistent with SB 412: gas turbines, reciprocating engines, microturbines, microengines, and steam turbines. Each technology category is populated by multiple manufacturers, product sizes, and performance variations, but certain key generalizations can be made. CCDC incorporates by reference the Catalog of CHP Technologies, prepared by the United States Environmental Protection Agency (“USEPA”) Combined Heat and Power Partnership, which contains information about each of the technologies listed above, including the information requested in the ALJ’s Ruling. The Catalog of CHP is available on the USEPA web site: <http://www.epa.gov/chp/basic/catalog.html>.

Another relevant document is the Combined Heat and Power Market Assessment (Draft Report, October 2009), prepared by ICF International, Inc. for the California Energy Commission (“CEC”). CCDC members actively participated in preparation of the Combined Heat and Power Market Assessment. This report focuses on CHP performance and cost data. The CHP Market Assessment is incorporated herein by reference and is available on the CEC’s web site: <http://www.energy.ca.gov/2009publications/CEC-500-2009-094/CEC-500-2009-094-D.PDF>.

Finally, CCDC notes that combustion-based CHP technologies were a mainstay of the SGIP in prior years and thus the Commission has substantial information regarding these technologies.

2. Proposed Incentive Levels

The incentive levels proposed by CCDC are based on the installed cost data contained in the CEC’s 2009 draft report, Combined Heat and Power Market Assessment (“CEC Assessment”). This installed cost data covers the prime mover, and balance-of-plant for chilled, hot water, and steam applications, including the cost of after-treatment systems. CCDC generally considers the installed cost estimates set forth in the CEC Assessment to be reasonable, with a few adjustments as follows:

- i. CCDC recommends adding to the CEC’s cost figures certain “soft costs,” including the costs related to project development, financing, and regulatory compliance. These soft costs are estimated to add an incremental 15% to the installed cost data shown in the CEC Assessment.⁶
- ii. The typical installed costs for small reciprocating engine-based CHP systems (*e.g.*, sized < 500 kW) are understated in the CEC Assessment at approximately \$2475/kW. In fact, these installed costs are typically closer to \$3400/kW. Installed costs for small

⁶ CHP Assessment, pp. 16-29.

reciprocating engine-based CHP systems (*i.e.*, “microengines”) and small turbine-based CHP systems (*i.e.*, “microturbines”) are very similar. CCDC’s cost estimates are supported by past statewide SGIP statistics, which show roughly equal costs for microengine- and microturbine-based systems sized <500 kW, based on “real-world” project data as submitted to SGIP program administrators. Finally, site-specific issues are not addressed in the CEC Assessment. Costs related to site-specific conditions also must be included. Such costs can cause actual installed costs to vary up or down by an additional 15% or more.

In consideration of the CHP Assessment and the comments above, CCDC proposes the following SGIP incentive levels:

Proposed Incentive Levels

Criteria	Size	Incentive	Comments
NG at 60% efficiency	<20 MW	\$1000/kW	Up to 1 st MW
NG at 60% efficiency	<20 MW	\$500/kW	From 1 st up to 2 nd MW
NG at 60% efficiency	<20 MW	\$250/kW	From 2 nd up to 5 th MW
CA Manufacturer	<20 MW	+20%	Per SB 412
Renewable Fuel	<20 MW	+20%	Added GHG reduction benefit
Small CHP	<500 kW	+20%	Higher cost burden
Institutional site	<20 MW	+20%	Capital constrained market
High GHG Performance	<20 MW	+20%	TBD in workshop(s)

3. Projected Market Potential

Section 3 of the CHP Assessment (see response to Question 1) provides the projected CHP market penetration and impact that would result from restoring SGIP incentives to levels that were in place prior to 2007. The CHP Assessment projects that restoration of the SGIP incentives to pre-2007 levels, coupled with other market inducements, will help realize the CARB goal of 4,000 new MW by 2020.

CCDC proposes SGIP incentive levels that are higher than pre-2007 incentives. Technology costs have increased due to advances in efficiency and improvements in combustion resulting from research and development. After-treatment costs to comply with CARB’s 2007 emission requirements are also major cost components and for engines and turbines can be 30% or more of total capital costs. Finally, interconnection costs have not gone down, and in a number of cases have increased. The higher incentive levels proposed by CCDC account

for these factors and will help accelerate and expand CHP market penetration across the entire size spectrum and help the state get closer to meeting CARB’s targets.

4. Commercial Availability

Gas turbines and reciprocating engines have been commercially available for several decades. These technologies are proven, but of course are still evolving, with continuous improvements being made to emissions performance, electric and thermal efficiencies, system attributes, interconnection capabilities, equipment and installation costs, etc.

Section 2.5.11 of the SGIP Handbook includes warranty requirements. Standard warranties on prime movers are typically one or two years. Extended warranties or service contracts are available to cover the three-year period required under the SGIP, and even beyond.

SB 412 requires that eligible system owners or operators maintain the performance of CHP systems over time to meet efficiency requirements, emissions standards, and GHG reduction levels.⁷ Accordingly, CCDC recommends that owners or operators be required to purchase a five year service agreement (warranty). It is likely that during the first five years of operation, the first major service requirements will be addressed for most CHP technologies, based on cumulative hours of operation. Having this service covered by a service agreement or extended warranty will provide the customer with a higher degree of assurance in the performance of the CHP system and the after-treatment system. For ease of administration, we recommend a separate, upfront \$/kW incentive on a net present value basis.

Under CCDC’s proposal, the warranty from the manufacturer or factory authorized vendor should cover the full cost of repair or replacement of defective components or systems, including coverage for labor costs to remove and reinstall defective components or systems. The major generating system components to be covered by a warranty include the generator set and associated equipment, primary heat recovery system, and gas cleanup systems for renewable fuels.

The incentive is based on typical operating and maintenance costs (“O&M”), assuming 8000 hours per year and 5 years of operation for typical size prime movers.

**Proposed 5 year Service Plan or Extended Warranty Incentive
(Based on 50% of estimated O&M costs over 5 years)**

Service Plan	Engines	Microturbines	Turbines
O&M cost over 5 years (\$/kWH)	0.020	0.015	0.006
Incentive (\$/kW)	\$400	\$300	\$120

⁷ “The customer receiving incentives shall adequately maintain and service the combined heat and power units so that during operation, the system continues to meet or exceed the efficiency and emissions standards...” Section 379.6 (c) (3).

**5. Certifications & Testimony, 6. Available Capacity Sizes & Range, and
7. Peak Load Reduction Potential**

This information is included in the documents incorporated by reference into the response to Question 1 above.

8. Waste Heat & Reliability Requirements (Level 3-N)

Shown below are representative natural gas (*i.e.*, nonrenewable) CHP technology profiles, taken from the CHP Market Assessment for gas turbines, engines and microturbines.⁸

Prime Mover Type	Gas Turbine	Rich Burn Recip Engine	Lean Burn Recip Engine	Microturbine	Steam Turbine
Performance Specs					
Size (kW)	10,000	100	800	65	3,000
Electric Efficiency (HHV)	29.0%	27.1%	35.0%	25.2%	6.9%
Heat Rate (BTU/kWh, HHV)	11,765	12,594	9,893	13,542	49,449
Overall Efficiency (HHV)	68.7%	81.0%	79.0%	71.5%	79.5%
PURPA Efficiency (LHV)	54.3%	60.1%	63.3%	53.7%	48.0%
Heat Rate Chargeable To Power (HHV)	5,927	4,370	4,389	5,704	4,574
GHG Emissions Chargeable to Power (#CO ₂ e/MWh)	693	511	513	667	535

“Efficiency” is defined in SB 412 as the useful energy output divided by fuel input.⁹ The overall efficiency values in the table above reflect the capabilities of the prime mover for specific heat quality conditions. Applied overall efficiency values may differ, depending on the site requirements, CHP sizing, and operating strategy. The overall efficiency values shown in the table are significantly higher than the 60% minimum overall efficiency threshold identified in SB 412. Likewise, the Public Utility Regulatory Policy Act efficiency values in the above table are significantly above the 42.5% requirement listed in the 2009 SGIP Handbook for Level 3 technologies.

9. Renewable Fuel Operation

For consistency, CCDC recommends that the following requirement, which is currently applicable to renewable fuel cells under the SGIP, apply to CHP systems using renewable fuels:

An applicant must demonstrate the availability of a renewable fuel, and must sign an affidavit stating that the project will comply with SGIP fuel

⁸ CHP Assessment, pp. 16-29.

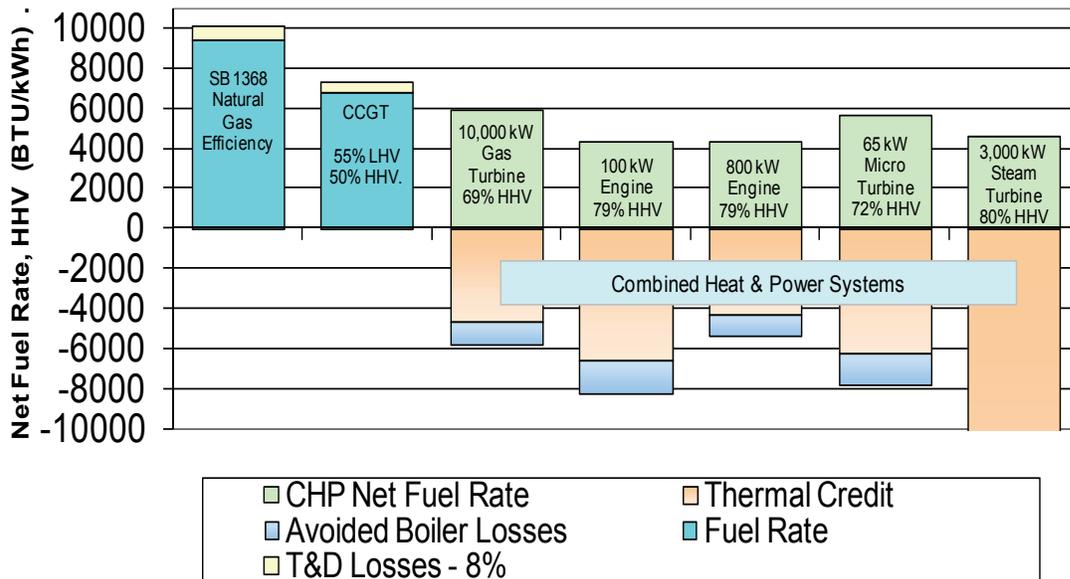
⁹ Pub. Util. Code § 379.6(c)(1) and (d).

requirements during the term of the required warranty period . Incentive payments are subject to refund if during any year the project uses more than 25% fossil fuel.¹⁰

10. Greenhouse Gas Emissions Requirement

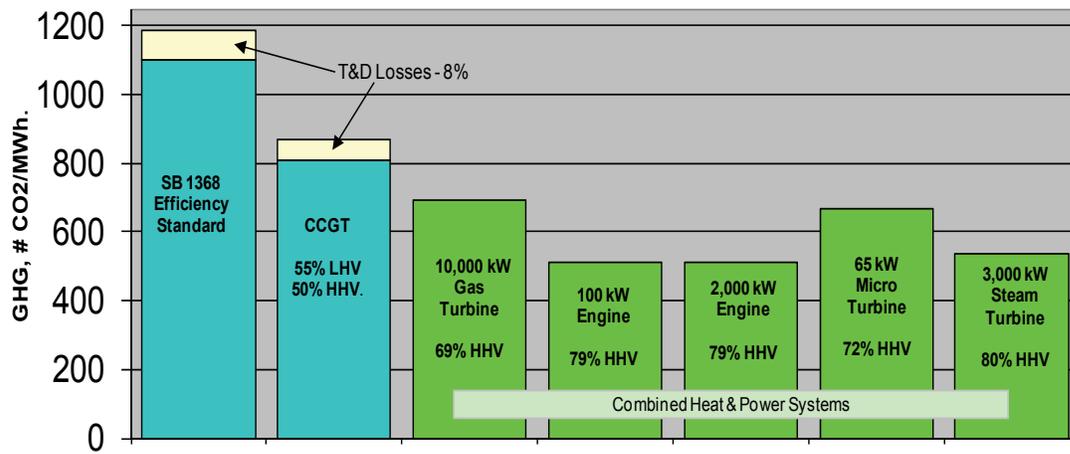
CCDC submits the following charts comparing CHP system capability to the performance standard adopted pursuant to SB 1368 and natural gas-fired Combined Cycle Gas Turbine central station power plants. Net fuel rate is depicted in the first chart and GHG emissions profiles are shown in the second chart. This data can be used as a basis for discussion at the January 7, 2010 workshop to address how CHP technologies meet the greenhouse gas emissions reduction requirement in SB 412 (section 379.6(b)).

**Net Fuel Rate
For Representative CHP Technologies**



¹⁰ See, e.g., PG&E's SGIP Handbook (May 8, 2009 Rev 1), p. 20 (PG&E's SGIP Handbook is available on PG&E's web site: <http://www2.pge.com/b2b/newgenerator/selfgenerationincentive/handbook/2009handbookandforms/index.shtml>).

GHG Emission Profiles



CERTIFICATE OF SERVICE

I, Barb Taylor, hereby certify that I served a copy of the **COMMENTS OF CALIFORNIA CLEAN DG COALITION ON THE IMPLEMENTATION OF SENATE BILL 412** on December 15, 2009, on all known parties to Service List for PUC DOCKET NUMBER R.08-03-008 via electronic mail to those whose addresses are available and via U.S. mail to those who do not have an electronic address.

I declare under penalty of perjury under the laws of the State of California that the above is true and correct.

Executed on this 15th day of December 2009, at Sacramento, California.

Barb Taylor /s/

Barb Taylor

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