

DOCKETED	
Docket Number:	23-SB-100
Project Title:	SB 100 Joint Agency Report
TN #:	269235
Document Title:	SB100 draft outline comments
Description:	N/A
Filer:	System
Organization:	david bezanson
Submitter Role:	Public
Submission Date:	3/17/2026 1:01:46 PM
Docketed Date:	3/17/2026

Comment Received From: david bezanson
Submitted On: 3/17/2026
Docket Number: 23-SB-100

SB100 draft outline comments

See attached pdf.

Additional submitted attachment is included below.

16 March 2026
CEC
CARB
CPUC

23-SB-100

<https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=23-SB-100>.

Comments on 2025 SB 100 Joint Agency Report Draft Results

Dear Agencies,

Thank you for releasing this sketch-in-progress as a slide show and inviting public comment. Your outline includes all baseload generation technologies (dirty and clean), while largely ignoring clean DER. This is inconsistent with AB32, SB32, SB100, SB 1020, and AB1279. The brief consideration of hydrogen does not specify whether the H2 is green, fossil, or some hybrid ratio that evolves over time. The thorny issue of when green hydrogen production will scale-up and decrease to a competitive price per liter is not mentioned. Currently, there are no plans to produce green H2 in CA.

SOCIAL COST OF CARBON

Absent from the overview is the Social Cost of Carbon (SCC). Accurate cost to benefit analyses require inclusion of SCC.

Though Fossil Gas (FG) power plants commonly have a useful life of 30 years,¹ the IRS depreciation schedule (GDS) allows deductions over a 7 year period. This enables high after-tax profit during the initial seven years. However, as a plant ages, the maintenance costs increase and next gen CCFG and other power-generating technologies emerge that are more efficient and profitable. Failure to plan decommissioning exposes FG plants to being shuttered, by government, because FG is not needed to power our grid and is incompatible with Legislature-mandated targets for emissions and composition of grid energy by 2030, 2035, 2040, and 2045. Many nations have plentiful electricity from clean energy, without use of any fossil fuels² and many more are generating 80 - 99% of their electricity from clean energy.³ To enable profitable long-term planning, the business community depends upon policy signals from government, well in advance of the effective date.

¹ [You Might Be Paying for a Worthless Gas Plant - RMI](#)

² [Renewable success stories: the countries with 100% renewable generation — RatedPower](#)

³ [60 Countries/Territories Whose Electricity Generation in 2023 was 50-100% Wind-Water-Solar \(WWS\) \(Including 12 With](#)

Recent research studying nations indicates that the percentage of FG that escapes as fugitive emissions is 1% to over 15%.⁴ When over 4.7%, lifecycle greenhouse gas (GHG) emissions from FG energy are comparable to that of coal energy.^{5, 6, 7, 8, 9, 10} A FG leak rate of 3.3 - 4.7% was found in Boston pipeline systems.¹¹ Decades of research have shown increased levels of many toxics and medical problems in buildings with FG appliances.^{12, 13}

A search on well-to-building fugitive emissions from Jan 2020 - Jul 2025 in Google Scholar revealed only two articles on the topic focused on California. These are reviewed in the next paragraph.

Researchers have isolated many kinds of sources of FG fugitive emissions. Most research on production mentions venting, flaring, and pipeline controls (e.g., valves and compressors). However, it is important to read the methodology section to see whether a study included these emissions sources in their cumulative percentages.

Building interiors

Small-volume sources¹⁴

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https://rmi.org/establishing-measures-to-achieve-near-zero-methane-waste-from-global-oil-and-gas-assets/?utm_medium=email&utm_source=spark&utm_campaign=2025_10_30&utm_content=spark&jobid=88547&sfmc_id=94727719

⁵ [Leaks Can Make Natural Gas as Bad for the Climate as Coal, a Study Says](#)

⁶ [Evaluating net life-cycle greenhouse gas emissions intensities from gas and coal at varying methane leakage rates - IOPscience](#)

⁷ [Liquefied natural gas carbon footprint is worse than coal | CALS](#)

⁸ [Coal vs. Natural Gas](#)

⁹ [Calculating Parity Between Gas and Coal Life-cycle Emissions - RMI](#)

¹⁰ [A National Estimate of Methane Leakage from Pipeline Mains in Natural Gas Local Distribution Systems | Environmental Science & Technology](#)

¹¹ [Majority of US urban natural gas emissions unaccounted for in inventories | PNAS](#)

¹² [Natural Gas Used in Homes Contains Hazardous Air Pollutants | Harvard T.H. Chan School of Public Health](#)

¹³ [National Building Pollution Report | Physicians for Social Responsibility](#)

¹⁴ [Small emission sources in aggregate disproportionately account for a large majority of total methane emissions from the US oil and gas sector](#)

Super emitters (CA)¹⁵

Abandoned wells^{16, 17, 18}

Offshore wells¹⁹

Storage tanks in Los Angeles²⁰

A cursory review of fugitive emissions research revealed that emissions rates measured after 2020 were higher than those found before 2020. This is largely due to more sophisticated and accurate monitoring technologies being used, including hand-held sniffers, drones, and satellites. No research was found that included emissions from all of the above kinds of sources : a) building interiors, b) pipelines from wells to buildings, c) wells (in-use and abandoned), d) storage tanks, e) offshore wells and pipelines, f) both super-emitter and small-volume sources. In fact, most research includes emissions from only one of these. Consequently, fugitive emissions are significantly underestimated. Comprehensive research would help us to obtain a more accurate estimate of total fugitive emissions and to formulate more effective national and international regulation.²¹ More precise totals of fugitive emissions are essential for calculating total emissions volumes and externalized costs of the FG industry.²²

¹⁵ [New Tool Maps the Health Impacts of Toxic Air Pollutants Released With Methane in Super-Emitter Events - Inside Climate News](#)

¹⁶ [A review of methane leakage from abandoned oil and gas wells: A case study in Lubbock, Texas, within the Permian Basin - ScienceDirect](#)

¹⁷ <https://pubs.acs.org/doi/full/10.1021/acs.est.4c05602>

¹⁸ <https://academic.oup.com/Sevenfold Underestimation of Methane Emissions from Non-producing Oil and Gas Wells in Canada | Environmental Science & Technology/nsr/article/12/7/nwaf184/8137905>

¹⁹ [Calculating Methane Emissions from Offshore Facilities Using Bottom-Up Methods](#)

²⁰ [Quantifying Emissions of Natural Gas Storage Tanks in the Greater Los Angeles Metropolitan Area](#)

²¹ [Rapid Increases in Methane Concentrations following August 2020 Suspension of the US Methane Rule | Environmental and Energy Policy and the Economy](#)

²² [US methane emissions dwarf EPA's data](#)

EPA research conducted in 2022 found that each FG power plant emitted an average of over 382,000 metric tons of CO₂ annually.²³ This does not include a) fugitive emissions from production and distribution systems, b) emissions during idling. A peaker plant that only operates nocturnally (12 hours daily) emits over 191 metric tons annually. Using the most current Social Cost of Carbon²⁴, a FG plant operating nearly full time has annualized externalized costs of over \$108 million. A plant operating half time has costs exceeding \$54 million. This only includes costs from combustion of FG in a plant. The 160 FG power plants in CA impose a total of \$12B in externalized costs annually on CA residents.

Sources of combustion of fossil fuels, including FG plants, emit toxic co-pollutants.²⁵ These cause significant amounts of morbidity and mortality, especially in EJ zones. Use of fossil fuels has high externalized costs.^{26, 27} Taxpayers are forced to pay these costs via higher taxes, weather extremes, wildfires, increased property insurance, higher energy prices, higher medical bills,²⁸ and shorter lifespans²⁹. The CA government is expending \$millions annually to curtail use of FG, while owners of FG assets spend \$millions annually to defeat decarb policies. This is rarely mentioned as an externalized cost of fossil energy.

SCC, based on the meta-analysis cited below, should be included in cost to benefit analyses of all energy planning. Non-energy benefits are also important to quantify.

AFFORDABILITY v SOCIAL COSTS

Consumers seek to maximize their marginal utility by paying less for more. This includes goods and services with high amounts of embedded carbon. Most consumers are quite aware that if they purchase these, it contributes to increased emissions of GHGs and toxic air pollutants. They are increasingly aware that most carbon offset arrangements are ineffective for curbing

²³ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references>
See second to last page.

²⁴ [Synthesis of evidence yields high social cost of carbon due to structural model variation and uncertainties | PNAS](#)

²⁵ <https://cacondor.substack.com/p/not-just-hot-air>

²⁶ [Synthesis of evidence yields high social cost of carbon due to structural model variation and uncertainties | PNAS](#) Contrast the cost with Cap & Trade results during 2025. Allowances sold for between \$25 to \$29 per ton - an average of \$27 per ton. However, half of allowances are handed out for free. So, in effect, revenue from allowances was about \$14 per ton, which is less than 5% of the Social Cost of Carbon.

²⁷ [What canceled climate data would have shown: The costliest 6 months of weather disasters on record](#)

²⁸ [The Risks and Harms of Gas-Fired Residential Appliances](#)

²⁹

<https://www.law.berkeley.edu/research/clee/research/climate/california-climate-action/costs-of-climate-change/>

emissions. Furthermore, consumers have often requested their government to establish policies that decrease their costs. They are also aware that this increases emissions. Simultaneously, they object to paying for government policies that invest in mitigation of emissions. They are especially vociferous about carbon pricing proposals that would increase the market price of goods. They prefer to spend more on luxuries including those with high embedded carbon. This makes it difficult for governments to pass and implement climate policies and discourages politicians from introducing such proposals. Lobbying on the part of high-emissions industries further deters politicians.

Affordability of goods with high amounts of embedded carbon is incompatible with efficacy of carbon pricing policies in decreasing emissions. There is probably an inverse correlation between these, as confirmed by research on economics and the SCC.^{30, 31, 32} Instead of policies to subsidize carbon-intensive goods, larger investments in mitigation, sooner rather than later, will provide a greater return on investment and decrease the future stream of mitigation and adaptation costs. Government subsidization of carbon-intensive goods would likely increase their consumption - defeating carbon pricing policies and increasing emissions and SCC. The latter is also referred to as externalized costs.

There are three kinds of affordability to consider: a) cost of production for industry, b) cost of finished goods, c) externalized costs (SCC). The payor for each, respectively, is a) industry, b) industry - and consumers who purchase high embedded carbon products (assuming that industry raises sales prices), c) everyone. The latter - c - includes high carbon intensity and low carbon intensity businesses, government units, and individuals and does not incentivize decarbonization, at least in the short run. Effective carbon pricing policies increase a) and b) while decreasing c).

If emissions-intensive businesses do not pay the full SCC for their products (via various mechanisms including carbon taxes), consumers at all levels (government, business, individuals) need to decide whether they prefer to pay higher prices for carbon-intensive goods or whether they prefer to pay the sum of higher a) income taxes to invest in mitigation, adaptation, and medical welfare benefits, b) property taxes, insurance, and repairs, c) medical bills and insurance premiums, d) more property damage expenses, e) shorter lifespans, etc. When emissions-intensive industries do not pay the full SCC, consumers can keep prices on carbon-intensive goods lower *if* they pay even more for the above sum of SCC costs (a - e).

The Polluter Pays Principle assigns responsibility for bearing SCC costs to polluters. The sum of

³⁰ [Synthesis of evidence yields high social cost of carbon due to structural model variation and uncertainties | PNAS](#)

Contrast the cost in this article with CA Cap & Trade results during 2025. Allowances sold for between \$25 to \$29 per ton - an average of \$27 per ton. However, half of allowances are handed out for free. So, in effect, revenue from allowances was about \$14 per ton, which is less than 5% of the SCC

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<https://www.law.berkeley.edu/research/clee/research/climate/california-climate-action/costs-of-climate-change/>

³²

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(25\)01919-1/fulltext?dgcid=raven_jbs_etc_feature_lancetclimate25](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(25)01919-1/fulltext?dgcid=raven_jbs_etc_feature_lancetclimate25) see Economics and Finance section for social costs

SCC costs from polluters is not being collected from emission-intensive industries. Instead it is being paid primarily by the victims (via a - e in the above paragraph). Only a small percentage of SCC is being collected from industry in CA, despite many decarbonization policies and a steep rise in annual SCC costs. Payment of a higher percentage by industry would benefit all residents, including executives of fossil firms. This would enable all victims to pay a smaller percent of SCC and while incentivizing industry to decarbonize. Small carbon taxes on goods with high embedded carbon may be compatible with sustaining profits of producers, but empirical *in vivo* research is needed to contrast the effects of small, moderate, and large carbon taxes.³³

Affordability for consumers and governments is maximized by making earlier investments in mitigation, clean energy, and decarbonization. Research published within the last ten years finds significantly higher estimates of SCC than prior research.³⁴ This indicates that use of higher SCC values in policy formulation and earlier investments in mitigation have the highest benefit to cost ratio for current and future generations. Investing a small percent of GDP on mitigation over the next ten years prevents higher costs in future decades than deferring investments to

³³ [Tax and pollution in a vertically differentiated duopoly: When consumers matter - Ceccantoni - 2023 - Metroeconomica - Wiley Online Library](#)

³⁴ [Database for the meta-analysis of the social cost of carbon \(v2026.1\)](#)

later decades.^{35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51} The amount of medical cost savings exceeds

³⁵ [Fighting climate change: Cheaper than 'business as usual' and better for the economy](#)

³⁶ [Empirically grounded technology forecasts and the energy transition](#)

³⁷ [Report Release: Headwinds for US Gas Power - RMI](#)

³⁸

https://ieefa.org/articles/carbon-capture-and-storage-power-sector-will-worsen-energy-inflation?utm_campaign=Daily%20Newsletter&utm_medium=email&_hsmi=252459648&_hsenc=p2ANqtz-8Y28HGv4uGO_wFTWkr96A-Z316MHwLnszWzFNfYd55-fdgxke3-aa5FRMqMh_KLqIKiSjt6ca43kDQG30tWwxA8DIpCw&utm_content=252459648&utm_source=hs_email

³⁹ [Decarbonising the energy system by 2050 could save trillions](#)

⁴⁰ [Decarbonising the energy system by 2050 could save trillions](#)

⁴¹ [Return on Investment: Research Links Climate Action with Land and Property Value Increases](#)

⁴² https://energyinnovation.org/wp-content/uploads/2021/01/Cost_of_Delay.pdf

⁴³ [Reality Check: US Renewable Energy Portfolios Can Outcompete New Gas Plants - RMI](#)

⁴⁴ [Deloitte research reveals inaction on climate change could cost the world's economy US\\$178 trillion by 2070](#)

⁴⁵ [Reliably hitting 85% clean electricity has huge implications for California — and the rest of the country | Utility Dive](#)

⁴⁶ [Scientists Say They've Created a Roadmap for Cutting US Emissions in Half by 2030 - Inside Climate News](#)

⁴⁷ [A 50% reduction in emissions by 2030 can be achieved. Here's how | EurekAlert!](#)

⁴⁸ [Energy, Health, and Climate Costs of Carbon-Capture and Direct-Air-Capture versus 100%-Wind-Water-Solar Climate Policies in 149 Countries | Environmental Science & Technology](#)

⁴⁹

<https://web.stanford.edu/group/efmh/jacobson/Articles/II/CombiningRenew/100PercentPaperAbstracts.pdf>

the amount of investment in mitigation.⁵²

Policies that make everything more affordable for everyone are disinflationary and, in the extreme, deflationary. Regimes of significant economy-wide deflation are associated with contraction of GDP, recession, and depression. To avoid this risk, governments are wise to create policies that make items with low externalized costs more affordable while increasing prices of items that have high externalized costs. This will keep the economy chugging along because it will not decrease demand (and may increase demand) for items with low externalized costs. To maximize multi-generational affordability of cost of living, carbon taxes on items with high externalized costs are best spent on mitigation. Risks of policies that aim to make everything more affordable include ballooning budget deficits (kick the can down the road), deregulation (catalyzing costly environmental destruction), cutbacks of agencies and other public services, decreased corporate profits, recession, more unemployment, and higher income tax rates.

POLICIES TO ACHIEVE CA CLEAN ENERGY TARGETS

The following policies have decreased the amount of baseload needed to provide 24/7 resilience, decreased curtailment of clean energy generation, and prevented electric rates from climbing faster. For over half a century, periods of fossil energy price inflation have constrained reliability of supply and raised costs of energy for ratepayers. We can avoid being held hostage by cartel-controlled, war-driven fossil inflation by developing only clean energy to replace existing fossil infrastructure.

The Direct Access program has been a valuable, but on-again off-again, policy for businesses who want long-term clean electricity. Unavailability has been due to oversubscription. Reform the policy to make it permanently available to all CA businesses.⁵³

Policies that develop more Demand Side Grid Support (DSGS) are critical to affordability and resilience of electricity supply to all parts of our grid. They decrease the amount of new generation, transmission, and distribution build out. Front-of-the-meter and behind-the-meter DER are complementary. Confer Resource Adequacy status to DSGS energy injected into the grid, including vehicle-to-grid, home batteries, rooftop solar, and VPPs. The efficacy, economy, and efficiency of DSGS and other forms of DER are improved when controlled with Grid

⁵⁰ [Projections of when each of 150 countries May eliminate air pollution and carbon emissions from all energy](#)

⁵¹ [Still No Miracles Needed: How Today's Technology Can Save Our Climate and Clean Our Ai](#)

⁵² [Health benefits far outweigh the costs of meeting climate change goals.](#)

⁵³ [Direct Access](#)

Enhancing Technologies, demand-response software, hourly granularity and trading, smart meters, and other load-sharing technologies and policies. More accurate cost-effectiveness analyses are revealed by studying DSGS technologies combined with one or more enabling grid policies.^{54, 55}

Battery storage in CA has reached nearly 17 GW. Because there are more benefits from new storage than new generation, build 2 GW of new storage capacity for every 1 GW of new generation. Commercially available clean storage technologies include many kinds of electro-chemical batteries, tidal kinetics, pumped hydro, thermal batteries, compressed air, gravity, concentrated solar power, and flywheels. A minimum build rate target, given increasing demand forecasts, is 8GW of clean storage and 4GW of clean generation annually - diversified across mid-scale and utility-scale projects. This rate should be re-evaluated annually.⁵⁶

Community clean energy, including community solar, has been a popular aspiration in CA, but CPUC has not finalized requisite regulations and parameters. Collaborate to finalize permitting pathways (e.g. Opt-In), ownership models, billing, financing, and distribution grid interfacing criteria for municipalities and rural coops.

A plan for phasing out fossil energy from the grid is being studied by CEC.⁵⁷ As plans are finalized, a joint-agency plan for commensurate development of clean DER is required. While planning is in progress a) no new FG plants should be permitted (e.g. Scattergood in LA), b) CEC should implement the Legislative mandate to harvest windfall profits of fossil firms during price spikes starting in 2026 (CEC announced last year that they were delaying compliance for several years - without providing a rationale). The cost of turbines for FG plants has recently doubled and the build time has increased to over 5 years. In contrast, according to the world-renowned Lazard Investment Bank, wind and solar generation are the two most economical forms of commercial generation and construction of utility-scale projects takes less than 18 months. Clean energy takes up less land area per GW than fossil fuel infrastructure. The price of storage batteries continues to plummet.

A high-DER scenario has been part of agency planning and should be calculated by the joint agencies and included in the current report as well as future revisions and updates. Interconnection queues have been several years long for several years for utility-scale clean energy. The agencies have considered potential reasons for this, but have not made plans to shorten the queues. Solving this problem is critical for high-DER scenarios to be effective. The

⁵⁴ [California Energy Commission : Docket Log.](#)

⁵⁵ [Rethinking Load Growth: Assessing the Potential for Integration of Large Flexible Loads in US Power Systems | The Nicholas Institute for Energy, Environment & Sustainability](#)

⁵⁶ [California's Battery Storage Fleet Continues Record Growth, Strengthening Grid Reliability](#)

⁵⁷ [Proposed Budget Plan for Fiscal Year 2024-2025](#)

current joint agency report should recommend solutions. CEC's Opt-In permitting website is a fine start toward solving this problem.

Outline a plan for collaboration with CAISO to make the energy imbalance and day ahead programs conducive to the utilization only of clean energy within the new Pathways RO. Set a goal of CA being an exporter of clean electricity and to cease being an importer of dirty electricity. The easiest and most profitable way to achieve this modular task is to scale-up storage so we may cease curtailment even when electric rates are low, store the electricity, export clean electricity to other states during evening hours when rates are at their peak.

Delete the use of dirty energy from recommended scenarios. This includes fossil hydrogen, biomass combustion, reactor extensions or new build,^{58,59} combustion of any kind of hydrogen, fossil energy, and CCS. The latter has been proven to be ineffective.⁶⁰ All of these have high externalized costs, high toxic emissions, and high carbon-intensity over the lifecycle.

2026 CA LEGISLATION TO EXPEDITE GRID DECARBONIZATION

Whether these pass, consider implementation of policies in future drafts.

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<https://www.sierraclub.org/sites/default/files/program/documents/Fact%20Sheet%20Sierra%20Nuclear%20Climate.pdf>

⁵⁹ <https://ssrn.com/abstract=5368365>.

⁶⁰ [Carbon Capture Technologies : Efficacy & Costs](#)

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I look forward to your next draft. More references are available upon request.

Sincerely,
David Bezanson

David Bezanson, Ph.D.
CA voter and resident