**BIOFUELWATCH • COMMUNITY ENERGY RESOURCE • INTERFAITH CLIMATE ACTION NETWORK OF CONTRA COSTA COUNTY • NATURAL RESOURCES DEFENSE COUNCIL • RODEO CITIZENS ASSOCIATION • SAN FRANCISCO BAYKEEPER • SIERRA CLUB, SAN FRANCISCO BAY CHAPTER • STAND.EARTH • SUNFLOWER ALLIANCE • 350 CONTRA COSTA**

March 22, 2021

Via electronic mail (joseph.lawlor@dcd.cccounty.us)[1]

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Department of Conservation and Development
30 Muir Rd
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*Re: Martinez refinery renewable fuels project (File No. CDLP20-02046) – comments concerning scoping*

Dear Mr. Lawler:

Biofuelwatch, Community Energy reSource, Interfaith Climate Action Network of Contra Costa County, Natural Resources Defense Council, Rodeo Citizens Association, San Francisco Baykeeper, Sierra Club, Stand.Earth, Sunflower Alliance, and 350 Contra Costa (collectively, Commenters) appreciate this opportunity to submit comments concerning the scope and content of Contra Costa County's Environmental Impact Report (EIR) for the proposed Martinez refinery (Refinery) renewable fuels project (Project) described in the February 17, 2021 Notice of Preparation (NOP); the September 10, 2020 Project Description, the October 1, 2020 Application and Initial Study for the Project; and the draft revised Project Description dated January 29, 2021.

We welcome the County's decision to prepare an EIR for this highly significant project. However, for the reasons explained in these Comments, it will be imperative that the County probe deeply into all relevant aspects of the Project in preparing the EIR, well beyond the information presented thus far by the Project proponent. The Application and associated documents generally assert Project sustainability, but contain limited information pertinent to actually quantifying and mitigating its impact – including, most notably, information necessary

[1] Most sources referenced in these Comments were sent March 19, 2021 via overnight mail on a thumb drive to the County. Exceptions are documents and information either known to be in the County's records (including the Application, the NOP, and documents provided by the County in response to Public Records Act requests from Commenters); and the documents referenced in note 103, which are a compilation of reports accessible through the cited link. Commenters can extract the data and send it in electronic form upon request, but will otherwise assume that is not necessary.

to determine an appropriate project baseline, the emissions and land use impacts of potential feedstocks, risks associated with increased hydrogen usage, and the impact of likely future equipment decommissioning. It will be imperative for the County, in preparing the EIR, to obtain, disclose, and thoroughly analyze all such information in order to identify appropriate alternatives and mitigating measures.

We note, in addition, our concern that we are submitting these comments without benefit of a final Project Description from the applicant. The most recent iteration of the full Project Description is the draft January 29, 2021 version, which contains modest but non-trivial changes from the October 2020 version. The short one-page summary description of the Project set forth in the NOP is not a substitute for the longer and more complete description provided by the applicant. To the extent any further changes may be made by the applicant to the Project Description prior to issuance of the draft EIR (DEIR), we request that those changes be sent to the undersigned commenters, and an opportunity provided to supplement these scoping comments to address any changes made.

## I. Statements of Interest

Biofuelwatch provides information, advocacy and campaigning in relation to the climate, environmental, human rights and public health impacts of large-scale industrial bioenergy. Central to the Biofuelwatch mission is promoting citizen engagement in environmental decision making in relation to bioenergy and other bio-based products – including bioenergy-related decisions on land use and environmental permitting.

Community Energy reSource offers independent pollution prevention, environmental justice, and energy systems science for communities and workers on the frontlines of today's climate, health, and social justice crises. Its work focuses on assisting communities with a just transition from oil refining and fossil power to clean, safe jobs and better health.

Interfaith Climate Action Network of Contra Costa County County (ICAN) is a non-profit environmental justice organization working group of California Interfaith Power and Light, whose offices are in Oakland. CA. The mission of ICAN is to inform and educate faith and non-faith communities and individuals about how to mitigate climate change, advocate with leaders of BILPOC communities before government agencies, industry and other organizations that need to hear our collective voices. They are committed to centering the voices of those most impacted by industry, particularly the communities close to the refineries in Contra Costa County.

Natural Resources Defense Council ("NRDC") is a nonprofit environmental membership organization that uses law, science, and the support of more than 440,000 members throughout the United States to ensure a safe and healthy environment for all living things. Over 2,200 of NRDC's members reside in Contra Costa County, some of those in the City of Rodeo. NRDC has a long-established history of working to ensure proper oversight of refining activities and minimize their carbon footprint and other environmental impacts, and ensure that biofuels are produced in a sustainable manner.

Rodeo Citizens Association is a non-profit environmental organization with the primary purpose of providing a means for the citizens of Rodeo to address issues of local concern with respect to health, safety, and the environment. Currently, RCA's primary activity is focused on promoting responsible use of land and natural resources around the community and to engage in community outreach activities involving education and awareness of environmental protection issues impacting the region.

San Francisco Baykeeper ("Baykeeper") has worked for the past 30 years to stop pollution in San Francisco Bay, and has more than five thousand members and supporters who use and enjoy the environmental, recreational, and aesthetic qualities of San Francisco Bay and its surrounding tributaries and ecosystems. San Francisco Bay is a treasure of the Bay Area, and the heart of our landscape, communities, and economy. Oil spills pose one of the primary threats to a healthy Bay, and environmental impacts from increased marine terminal activity directly threaten Baykeeper's core mission of a Bay that is free from pollution, safe for recreation, surrounded by healthy beaches, and ready for a future of sea level rise and scarce resources. San Francisco Baykeeper is one of 300 Waterkeeper organizations working for clean water around the world. Baykeeper is a founding member of the international Waterkeeper Alliance and was the first Waterkeeper on the West Coast.

The San Francisco Bay Chapter is the local branch of the Sierra Club, America's largest and most effective grassroots environmental organization. The Bay Chapter is comprised of the nearly 40,000 Sierra Club members who live in Alameda, Contra Costa, Marin, and San Francisco counties. As the trusted local arm of one of the nation's oldest and largest environmental organizations, they are rooted in nearly a century of service to the mission of exploring, enjoying, and protecting the environment. They are committed to seeking oversight on environmental and land use permitting and seek to ensure that energy is produced as sustainably as possible.

Stand.earth is a San Francisco-based nonprofit that challenges corporations and governments to treat people and the environment with respect, because our lives depend on it. From biodiversity to air, to water quality and climate change, Stand.earth designs and implements strategies that make protecting our planet everyone's business. Its current campaigns focus on shifting corporate behavior, breaking the human addiction to fossil fuels, and developing the leadership required to catalyze long-term change.

The Sunflower Alliance engages in advocacy, education, and organizing to promote the health and safety of San Francisco Bay Area communities threatened by the toxic pollution and climate-disruptive impacts of the fossil fuel industry. They are a grassroots group committed to activating broader public engagement in building an equitable, regenerative, and renewable energy-fueled economy.

350 Contra Costa is a home base and welcoming front door to mobilize environmental activism. It is comprised of concerned citizens taking action for a better community. They envision a world where all people equitably share clean air, water and soil in a healthy, sustainable, and post-carbon future. It is a local affiliate of 350 Bay Area**.**

## II. Scoping Comments Overview

The breadth of the California Environmental Quality Act (CEQA) review the Project requires is hard to overstate. While the Project is billed by its proponent as a means of reducing environmental impacts, for reasons explained in these Comments, there are multiple sound reasons to believe that the Project may, in fact, result in new and/or increased environmental impacts that must be evaluated in the draft EIR (DEIR). The very scale of the Project, including multiple construction and operational components, underscores the challenge presented in preparing the DEIR. The Project includes, among others, the following:

- A feedstock switch unprecedented at the Martinez refinery, from petroleum hydrocarbons to agriculture-derived triacylglycerols (TAGs) and their fatty acids, rendered fats, and possibly fish oil.
- An unprecedented concentration of biofuel production using repurposed hydrotreaters and hydrocrackers in a single refinery.
- Unprecedented demand for food system-supplied feedstock coming into Contra Costa County, and associated transport to the Rodeo refinery.
- Fundamental changes at the Martinez refinery in fuels processing equipment, configuration, process materials and inputs, processing chemistry, reactor process conditions, and process control needs—including but not limited to unprecedented hydro-conversion refining intensity.
- Feedstock transportation issues affecting facilities, people and environments in multiple counties.
- A pivotal choice between fossil fuel-based production methods versus renewable hydrogen-based fuels production, which could be locked into place for the duration of project operation and set precedents for other planned and proposed biofuel projects.

As discussed in the sections below, the Project is likely to result in multiple new and in some cases greater environmental impacts that will need to be addressed in the DEIR, including many that appear likely to be significant in the absence of measures to lessen or avoid them. These include the following:

- *Indirect Land Use Changes*. The DEIR will need to either definitively identify the feedstocks the Project will employ, backed up by a binding commitment by Marathon, or else assume a worst-case scenario in terms of feedstock impacts on land use - which can include not only carbon intensity impacts but other environmental harms.
- *Food system impacts*. In the absence of binding assurance that the Project will not use food-system feedstock, the DEIR should evaluate the impact of use of large quantities of such feedstocks on food prices, food insecurity, and food systems more generally.
- *Air emissions impacts*. Air emissions from the Project will vary with the choice of feedstocks, and some feedstocks may result in significant emission increases that will need to be addressed in the DEIR.

- *Impact on California electrification policies*. The DEIR should consider the impact of an increased biofuels supply on California's vehicle electrification goals – both in terms of the Project impacts and cumulative impacts together with other planned and possible refinery biofuels conversions.
- *Transportation impacts*. The Project envisions changes in the flow and transportation of feedstocks and refined products to and from the Refinery. Those changes must be evaluated in the DEIR.
- *Process safety risks*. Producing biofuels on repurposed crude oil refining equipment requires increased hydrogen throughput, which in turn increases the risk of process upsets. That risk must be evaluated in the DEIR.
- *Site decommissioning*. The DEIR should consider the likelihood that the Project will result in the Refinery being decommissioned entirely within a predictable timeframe, and evaluate the impact of decommissioning and means to mitigate it.

In addition, it will be critical for the DEIR to identify the proper baseline against which to compare Project alternatives – the "no project" alternative required by CEQA. It is by no means clear that the "no project" alternative would be business as usual, *i.e.*, indefinitely continued crude oil refining. The Refinery is currently shut down. There is extensive evidence indicating that, if the Project were not approved, Marathon would not re-commence processing crude oil at the refinery. If that is the case, then the project baseline against which impacts are measured is a shuttered refinery, not continued crude oil refining.

Finally, the DEIR must evaluate a suite of alternatives aimed at minimizing project impacts. One such alternative is the use of renewable-powered electrolysis, or "green hydrogen," rather than the fossil fuel-powered hydrogen production currently on site.

## III. The DEIR Should Determine the Extent to Which the Refinery Would Continue Operation Under the "No Project" Alternative

In examining a range of alternatives, an EIR is required to include a "no project" alternative that serves as a baseline for assessing the impact of the remaining alternatives. "The purpose of describing and analyzing a no project alternative is to allow decisionmakers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. ..." CEQA Guidelines,[2] § 15126.6, subd. (e)(1). "The 'no project' analysis shall discuss the existing conditions ... as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services. ..." (CEQA Guidelines, § 15126.6, subd. (e)(2).) It is essential that the "no project" alternative accurately reflect the status quo absent the project, to ensure that the baseline for measuring project impacts is not set too high, which would artificially diminish the magnitude of Project impacts. *See Ctr. for Biological Diversity v. Dep't of Fish & Wildlife* (2014), 234 Cal.App.4th 214, 253 (citation omitted) (emphasis in original) ("a no project alternative in an EIR "provides the decision makers and the public with specific information about the environment if the project is not approved. It is a factually based forecast of the environmental impacts of *preserving the status quo*. It thus provides the decision makers

[2] The CEQA Guidelines are codified at 14 Cal.Code Regs. § 15000 et seq.

with a base line against which they can measure the environmental advantages and disadvantages of the project and alternatives to the project."). The chosen baseline must reflect actual conditions at the Refinery, not just hypothetically possible ones. *Communities for a Better Environment v. South Coast Air Quality Management District* (2010), 48 Cal.4th 310, 320-21 ("A long line of Court of Appeal decisions holds, in similar terms, that the impacts of a proposed project are ordinarily to be compared to the actual environmental conditions existing at the time of CEQA analysis, rather than to allowable conditions defined by a plan or regulatory framework.").

The Refinery is currently closed, and not processing crude oil at all. Until and unless Marathon can show that it would resume crude operations if the Project were not approved, then there will be no substantial evidence to support setting the baseline "no project" alternative at anything other than zero – *i.e.*, no refining operations and associated impacts. If Marathon would not re-commence crude oil refining in the absence of the Project, this would mean that the Project would not achieve all - or possibly any – of the claimed emissions reductions set forth in the Project application; and might, in fact, increase emissions significantly over the baseline. It is hence critical that the County, in defining the "no project" alternative, carefully scrutinize any claims on the part of Marathon that it would continue operation of the Refinery in the absence of the Project.

### A. Evidence Suggests the Refinery Will Remain Closed Without the Project

It appears, based on information currently available, that Marathon does not, in fact, intend to re-commence crude oil processing at the Refinery if the Project application is not approved. The most important piece of information that would support this conclusion is simply the fact that the Refinery has closed – long before the reasonable prospect of a Project approval, and before the Application was developed and submitted. Petroleum refining operations ended there on April 28, 2020.[3] In July 2020, Marathon asserted that closure was permanent with no plans to restart the refinery.[4] This project launched later. Marathon was "evaluating the possibility" of this project in August,[5] began "detailed engineering" for the project during October–December 2020,[6] and "approved these plans" on February 24, 2021.[7] The Project Description does not propose restarting oil refining as an alternative to the Project.

Beyond this fact of the Refinery's current closed state, there is extensive information indicating that the decision to close the Refinery was likely not grounded in plans to pursue the

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[3] April 28, 2020 Flare Event Causal Analysis for Tesoro Refining and Marketing Company, subsidiary of Marathon Petroleum, Martinez Refinery Plant #B2758, submitted to the Bay Area Air Quality Management District dated June 29, 2020. Accessed from www.baaqmd.gov/about-air-quality/research-and-data/flare-data/flare-causal-reports.
[4] Workshop Report, Draft Amendments to Regulation 6, Rule 5: Particulate Emissions from Petroleum Refinery Fluidized Catalytic Cracking Units. January 2021. Bay Area Air Quality Management District: San Francisco, CA. *See* p. 14 FN; captions of tables 1, 2, 6, 8–10.
[5] August 25, 2020 email from A. Petroske, Marathon, to L. Guerrero and N. Torres, Contra Costa County.
[6] US Securities and Exchange Commission Form 10-K, Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2020, by Marathon Petroleum Corporation. Accessed from https://www.marathonpetroleum.com/Investors/ *See* p. 50.
[7] *Id*.

Project, but rather was the result of economic factors and resultant business directions independent of the possibility of re-purposing the refinery to produce biofuels.

Specifically, evidence strongly indicates that the Refinery closed as part of a consolidation of refining assets. Refining assets follow the rule of returns to scale. Over time, smaller refineries expand or close.[8] Consolidation, in which fewer refineries build to greater capacity, has been the trend for decades across the U.S.[9] The increase in total capacity concentrated in fewer plants[10] further reveals returns to scale as a factor in this consolidation. Access to markets also is a factor. The domestic market for engine fuels refined here is primarily in California and limited almost entirely to the West Coast.[11] In this context, Tesoro, Andeavor, and Marathon expanded refining capacity elsewhere in this market instead of at the Martinez Refinery—investment decisions that created the largest refinery on the West Coast in Los Angeles[12] and left Marathon with *extra* capacity in California, and across the West Coast, even after its Martinez refinery closed. See Table 1.

**Table 1. Total Operable Atmospheric Crude Distillation Capacity of West Coast Refineries Owned by Marathon Petroleum Corp. / Andeavor / Tesoro Refining and Marketing, 2010–2020.** [a]

*Capacities in barrels per calendar day (b/cd) from January 1 of each year.*

| Year | Los Angeles, CA | Martinez, CA | Anacortes, WA | California Subtotal | CA & WA Subtotal |
|---|---|---|---|---|---|
| 2010 | 96,860 | 166,000 | 120,000 | 262,860 | 382,860 |
| 2011 | 94,300 | 166,000 | 120,000 | 260,300 | 380,300 |
| 2012 | 103,800 | 166,000 | 120,000 | 269,800 | 389,800 |
| 2013 | 103,800 | 166,000 | 120,000 | 269,800 | 389,800 |
| 2014 | 355,500 | 166,000 | 120,000 | 521,500 | 641,500 |
| 2015 | 361,800 | 166,000 | 120,000 | 527,800 | 647,800 |
| 2016 | 355,170 | 166,000 | 120,000 | 521,170 | 641,170 |
| 2017 | 364,100 | 166,000 | 120,000 | 530,100 | 650,100 |
| 2018 | 341,300 | 166,000 | 120,000 | 507,300 | 627,300 |
| 2019 | 363,000 | 161,500 | 119,000 | 524,500 | 643,500 |
| 2020 | 363,000 | 161,000 | 119,000 | 524,000 | 643,000 |
| | Growth in capacity from 2010–2020 in barrels per day: | | | 261,140 | 260,140 |
| | Growth as a percentage of Martinez capacity on 1/1/20: | | | 162 % | 162 % |

[a] Data from *Capacity Data by Individual Refinery;* U.S. EIA; www.eia.gov/petroleum/refinerycapacity/archive.

Since refineries wear out in the absence of sufficient reinvestment,[13] and run more efficiently when running closer to full capacity, those decisions to invest and expand elsewhere

[8] Meyer, D.W., and Taylor, C.T. The Determinants of Plant Exit: The Evolution of the U.S. Refining Industry. Working Paper No 328, November 2015. Bureau of Economics, Federal Trade Commission: Washington, D.C. https://www.ftc.gov/system/files/documents/reports/determinants-plant-exit-evolution-u.s.refining-industry/wp328.pdf
[9] *Id*.
[10] *Id*.
[11] PADD 5 Transportation Fuels Markets, September 2015 (PADD 5 2015), U.S. Energy Information Administration (EIA). https://www.eia.gov/analysis/transportationfuels/padd5/
[12] Marathon Petroleum Corp., 2019 Annual Report, Part I, p. 9 (2019 Annual Report). https://www.annualreports.com/HostedData/AnnualReportArchive/m/NYSE_MPC_2019.pdf.
[13] See G. Karras, *Decommissioning California Refineries: Climate and Health Paths in an Oil State* at 20, *available at* https://www.energy-re-source.com/decomm (July 2020) and supporting material (Karras 2020).

set the stage for refining asset consolidation. And indeed, Marathon informed its investors that it expected to complete the "consolidation" and expansion of its refining facilities in Los Angeles in the first quarter of 2020,[14] just before it finally closed the Refinery in April. In fact, closing the Refinery lets Marathon run its Los Angeles and Anacortes refineries closer to full.

This consolidation should be understood in the context of a declining market, which further reinforces the evidence that the Refinery closure is independent of plans for the Project. The Refinery was losing its market. Its domestic market is limited to the West Coast,[15] and West Coast demand for refined products peaked years ago, starting an unprecedented decade-on-decade decline.[16] This decline is accelerating in part because electric vehicles are replacing gasoline demand. Going three times as far per unit energy as gasoline-burning cars, and with fewer moving parts to wear out and fix along the way—e.g., no transmission—battery-electric vehicles will cost less overall.[17] State climate policy is intentionally encouraging the switch to EVs, as part of a policy to phase out most gasoline and diesel vehicles rapidly.[18]

In light of these trends, the COVID-19 pandemic cannot be fingered as the sole cause of the Refinery shutdown, or evidence that it is temporary. Although COVID-19 caused a 26 percent drop in refining, [19] no other California oil refinery closed during the pandemic. COVID further revealed the limits of refineries' increasing reliance on exports to foreign markets, which command lower prices than we pay here, as a way out of this self-inflicted crisis – but again, the impact of that reliance inherently fell harder on the Refinery. Statewide engine fuels exports come mainly from the Bay Area rather than from Southern California,[20] which put the Refinery at the epicenter of this crisis. Moreover, the Refinery's setting, landward of a shallow shipping channel that forces tankers to partially unload before calling at Martinez, wait for high tide to sail to and from Martinez, or both,[21] put it in a worse export position than its competitors in Richmond and Los Angeles. All available information thus indicates that it was simply more economical – for reasons predating both COVID-19 and the Project – for Marathon to run two refineries closer to full than it was to run three refineries closer to empty. Marathon closed the Refinery in the face of declining fuels demand, when it had more than replaced the capacity of this refinery in Los Angeles, as shown in Table 1. At worst COVID only accelerated its closure.

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[14] 2019 Annual Report. *See* "From the Chairman and CEO" at p. 1.
[15] PADD 5 2015.
[16] West Coast (PADD 5) Supply and Disposition, EIA February 26, 2021. http://www.eia.gov/dnav/pet/pet_sum_snd_d_r50_mbbl_m_cur.htm; New Climate Threat: Will Oil Refineries make California the Gas Station of the Pacific Rim? Communities for a Better Environment (CBE). http://www.cbecal.org/resources/our-research
[17] Palmer et al., Total cost of Ownership and Market Share for Hybrid and Electric Vehicles in the UK, US and Japan. *Applied Energy* 209: 108-119 (2018) (Palmer et al. 2018). www.researchgate.net/publication/321642002_Total_cost_of_ownership_and_market_share_for_hybrid_and_electric_vehicles_in_the_UK_US_and_Japan
[18] California Executive Order N-79-20 (September 23, 2020), *available at* https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-text.pdf.
[19] Community Energy reSource. 2021, *COVID and Oil*. https://www.energy-re-source.com/covid-and-oil
[20] Padd 5 2015.
[21] Draft Integrated General Reevaluation Report and Environmental Impact Statement, San Francisco Bay to Stockton, California Navigation Study, April 2019. U.S. Army Corps of Engineers: Jacksonville, FL. *See* p. ES-3, maps. https://usace.contentdm.oclc.org/digital/collection/p16021coll7/id/11171

Thus, it is highly significant that in the competition between major California refineries over a shrinking, climate-constrained, and electric vehicle-challenged petroleum fuels market, this one closed first; and no other has closed. It lost that competition after Marathon and former owners of this refinery prioritized investments in refining assets elsewhere instead of Martinez. Those investment decisions effectively divested from the competitiveness of this refinery, and were implemented before COVID-19 and before this project was conceived, engineered, or proposed. These facts must be considered in evaluating the true "no project" baseline that accurate environmental review will depend upon in the DEIR.

Finally, Marathon's evident intent to close the Refinery, and the history of chronic under-investment in the Refinery by its multiple owners, must be evaluated in the context of the overall increasingly poor profit margins of crude oil refining These declining profit margins have led to the closure, and in some cases conversion to biofuels production, of numerous refineries in California and throughout the country. Refinery profits across the nation have been declining since before the COVID pandemic.[22] Refineries are closing or converting to biofuel production in the United States and throughout the world, and there is significant doubt whether the economics of refining will improve post-pandemic.[23] The International Energy Agency (IEA) reported in November 2020 that roughly a dozen refinery closures had been announced in the previous few months, with the bulk of the capacity closures – over 1 million b/d – happening in the United States. IEA stated in its monthly report, "There were capacity shutdowns planned for 2020-2021 prior to COVID-19, but the bulk of the new announcements reflect pessimism about refining economics in a world suffering from temporary demand collapse and structural refining overcapacity."[24] Specifically in California, growth reversed years ago in both the crude supply and the market that California refineries were first built to tap.[25]

Thus, the Refinery very likely would have closed—with or without the pandemic—because of chronic under-investment in its competitiveness with other refineries that compete for the same dwindling petroleum fuels market. The DEIR should evaluate all of these facts in establishing the baseline from which Project impacts are measured, and in determining the need for mitigation. If, in fact, the Refinery has been forced by current circumstances to cease crude oil production, then the "no project" alternative would almost certainly have less environmental impact than any Project alternative. It is thus crucial that the County assess complete information as to whether any crude would be processed at the Refinery in the absence of the Project.

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[22] "Bad News for Oil: Refinery Profits are Sliding," *Oilprice.com* January 13, 2020, *available at* https://oilprice.com/Energy/Oil-Prices/Bad-News-For-Oil-Refinery-Profits-Are-Sliding.html.

[23] *See* "Factbox: Oil Refiners Shut Plants as Demand Losses May Never Return," *Reuters* November 10, 2020, *available at* https://www.reuters.com/article/us-global-oil-refinery-shutdowns-factbox/factbox-oil-refiners-shut-plants-as-demand-losses-may-never-return-idUSKBN27R0AI; "Refinery News Roundup: Refinery Closures Loom," *Platts S&P Global* November 12, 2020, *available at* https://www.spglobal.com/platts/en/market-insights/latest-news/oil/111220-refinery-news-roundup-refinery-closures-loom-across-the-globe.

[24] "Permanent Oil Refinery Closures Accelerate as Pandemic Bites – IEA," *Reuters* November 12, 2020, *available at* https://www.reuters.com/article/oil-refining-shutdowns/permanent-oil-refinery-closures-accelerate-as-pandemic-bites-iea-idUSL1N2HY13P.

[25] G. Karras, *Decommissioning California Refineries: Climate and Health Paths in an Oil State* at 20, *available at* https://www.energy-re-source.com/decomm (July 2020) and supporting material (Karras 2020).

Additionally, it is essential that the DEIR contain an accurate description of current operations, rather than suggesting that crude oil refining is ongoing or poised to re-start when that is not the case. For instance, the Project Description states that an objective of the Project is to "Eliminate the refining of crude oil at the Martinez Refinery while preserving high quality jobs."[26] However, crude oil refining has already been eliminated, because the Refinery has been idled, with no evidence to suggest that crude refining will re-commence if the Project is not approved. Likewise, the description of "Existing Refinery Operations," while acknowledging at the end that the Refinery has been idled, is otherwise written as though it were still functioning, describing transport and other operations in the present tense.[27] All such descriptions should refer, as is accurate, to past operations at the Refinery only.

## IV. The DEIR Should Consider the Full Array of Risks and Impacts of the Project

The Application contains limited and incomplete information concerning project environmental impacts. The Application-related materials for this Project (unlike those for the Phillips 66 Project) include an Initial Study. However, the Initial Study is of limited value for scoping purposes. As discussed below, this document inappropriately limits the scope of analysis of key impacts – in particular land use impacts and state climate policy implications – and ignores others entirely. Particularly problematic is that it contains no indication of the types of feedstock that will be used, even though, as explained below, environmental impacts (both direct and indirect) vary broadly with the choice of feedstock.

Nonetheless, significant information to inform an analysis of the Project's impacts is readily available, and should be collected and thoroughly explored by the County in the process of preparing the DEIR. Below are descriptions of a few key areas of environmental impact that merit particular focus.

### A. Indirect Land Use Change Associated with Feedstock Choice

Marathon provides no specific information in its project description as to the feedstocks it will use. It states only, "The renewable feedstocks are expected to include biological based oils (e.g., soybean oil and corn oil), rendered fats, and other miscellaneous renewable feedstocks including but not limited to used cooking oils, other vegetable oils, and alternative biological derived feedstocks, however, it will not use palm oil."[28] The feedstock choice is thus left entirely indefinite. No further information is provided as to which of this broad array of potential feedstocks will be used, and signals no commitment to use any particular feedstock or combination of feedstocks.

However, the type of feedstock that will be used – whether known or assumed for analytical purposes – is critical to assessment of the Project's impacts, given that carbon emissions and other air emissions vary significantly with the type of feedstock used – indeed, such differences are an underpinning of California's Low Carbon Fuel Standard (LCFS). It is therefore essential that Marathon either commit to use of a particular suite of feedstocks prior to

[26] Project Description at 1-2.
[27] *Id.* at 1-3 – 1-4.
[28] *Id.* at 1-1.

preparation of the DEIR, or that the DEIR consider (and that the County assume absent proof to the contrary) a range of reasonably possible feedstock scenarios, including worst-case environmentally problematic scenarios, and run analysis on all of them.

In evaluating feedstocks and their potential associated impacts, the DEIR should consider the actual availability of such feedstocks on the market. Currently, availability of some of the possibly less environmentally problematic feedstocks, in particular waste cooking oil, may be highly limited – not only due to current pandemic conditions (which have limited restaurant operation and waste output), but more generally due to the influx of biofuel producers into the market.[29] Camelina grass may be a lower-impact feedstock as well, but supplies are likewise currently somewhat limited, and no commercial commodity channels currently exist for its marketing and utilization in the U.S.[30] It bears note that Phillips 66 proposes to use roughly the same array of possible feedstocks as Marathon, such that the two refineries will be in direct competition for those feedstocks. Thus, any claims by Marathon at this juncture to use a particular feedstock, to the extent not backed up by a binding commitment, may prove illusory if market supply of the identified feedstock is not available.

A number of feedstocks, including most notably food-grade soy oil, raise the specter of significant impacts from indirect land use change (ILUC). Recent research concludes that soybean production may be indirectly contributing to deforestation in the Amazon region and elsewhere.[31] Even if Marathon were to commit to domestic sourcing of feedstock soybean oil, the commodity is internationally traded, such that the market impact of a large new commercial consumer may affect international supply and prices, and further drive any impact on deforestation.[32] In its Initial Study, Marathon checked the "no impact" box on the question of whether the Project would "r]esult in the loss of forest land or conversion of forest land to non-forest use."[33] However, in reaching that conclusion, Marathon considered only direct impacts from construction of the Project, not indirect feedstock impacts.[34]

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[29] *See* "California Restaurants are Hurting. That Means Less Leftover Cooking Oil to Make Biofuels," *San Francisco Chronicle* December 13, 2020, *available at* https://www.sfchronicle.com/business/article/California-restaurants-are-hurting-That-means-15796514.php; "Facing Wave of Closures, Oil Refiners Turn to Biofuels," *Reuters* October 19, 2020, *available at* https://www.reuters.com/article/europe-refining-idUSKBN2742CX,

[30] *See* Camelina for Biofuel Production, *Farm Energy* April 3, 2019, *available at* https://farm-energy.extension.org/camelina-for-biofuel-production/; Oregon State Extension Service, *Economics of Oilseed Crops and their Biodiesel Potential in Oregon's Willamette Valley,* May 2008, *available at* https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/sr1081.pdf.

[31] C. Malins, "Soy, Land Use Change, and ILUC-Risk," *Cerulogy* November 2020 (Malins 2020), *available at* https://www.transportenvironment.org/sites/te/files/publications/2020_11_Study_Cerulogy_soy_and_deforestation.pdf; R. Garr and S. Karpf (Garr and Karpf 2018), *Burned: Deception, Deforestation and America's Biodiesel Policy*, January 2018, *available at* https://www.mightyearth.org/2018/01/09/burned/.

[32] "Brazil Allows Imported Soy in Biodiesel Production, *United States Department of Agriculture Foreign Agricultural Service,* November 20, 2020 (USDA FAS), *available at* https://www.fas.usda.gov/data/brazil-brazil-allows-imported-soy-biodiesel-production. *See also* R. Fuchs, C. Brown et al., "US-China Trade War Imperils Amazon Rainforest," *Nature* 567(7749):451 (March 2019), abstract *available at* https://www.researchgate.net/publication/332037157_US-China_trade_war_imperils_Amazon_rainforest; "Millions of Acres of the Amazon are at Risk Due to the Trade War Between U.S. and China," *Pacific Standard* April 18, 2019, *available at* https://psmag.com/economics/amazon-could-be-biggest-casualty-of-us-china-trade-war.

[33] Initial Study at 2-9.

[34] *Id.* at 2-10 – 2-11.

We note, in addition, that carbon intensity (CI) calculations associated with the LCFS are not dispositive of all ILUC impacts. LCFS CI calculations are not designed to capture the full range of impacts associated with deforestation and other land use changes that may be wrought by increased production of biofuel feedstock crops.[35] Those changes do not just affect carbon emissions, but also risk an array of other environmental impacts to habitats, human health, and indigenous populations.[36] Conversion of more natural habitat to cropland is often accompanied by efforts to boost short-term yields by applying more fertilizers and pesticides, thereby destroying habitat needed to reverse biodiversity loss. Indeed, authoritative international bodies have warned explicitly about the potential future severity of these impacts.[37]

Accordingly, the DEIR should be grounded in complete modeling data concerning ILUC and other impacts that may result from any feedstock or combination of feedstocks that Marathon will be able to run at the refinery, to the extent either the Project design or a binding commitment from the company does not exclude or limit the use of such feedstock. The modeling analysis should consider as parameters, *inter alia,* (i) the price and availability of feedstock sources, assuming varying numbers of biofuel producers and conversions to biofuel production in California and the US, and (ii) the ILUC impacts that will result from use of any given feedstock or feedstock combination, by Marathon and cumulatively by other biofuel producers in the present or anticipated future.

### B. Impact of Food System Feedstocks on Food Supply and Prices

The Project proposes to use as feedstock, at least in part, lipids produced and used in the currently existing food system. Except to the extent Marathon can use waste cooking oil – which is in short supply, as described above - the project is likely to require use of food-grade feedstock. Such use would lock Marathon into competition with current users of our food system, boosting food prices and creating a threat to people and communities suffering from food insecurity. Accordingly, it is essential that the DEIR include a quantitative analysis of the impact of the Project on food price and availability.

#### 1. The Project Would Very Likely Use a Significant Volume of Food System Oil

The project would convert existing refining technology into a "Hydrotreating Esters and Fatty Acids" (HEFA) biofuel refinery. HEFA technology feeds lipids, and more specifically, lipids from triacylglycerols (TAGs) and fatty acids cleaved from those TAGs, from biomass. Except for fish oils (a seriously questionable refinery feed), the only HEFA feeds of this type that are available for this in commercially relevant amounts are from land-based food systems. These include oil crops such as soybean, corn (distillers corn oil), canola, rapeseed, and cottonseed oils, tropical palm oil, fats rendered from livestock fed mainly, in the U.S., on oil crop byproducts (beef tallow, "white grease" rendered from pork, and poultry fats); and used cooking

[35] "LCFS Land Use Change Assessment," CARB, *available at* https://ww2.arb.ca.gov/resources/documents/lcfs-land-use-change-assessment.
[36] Malins 2020, Garr and Karpf 2018.
[37] IPBES (2019): Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES: Bonn, DE, *available at* https://ipbes.net/global-assessment; *see esp.* pp. 12, 18, 28.

or waste oils ("yellow" and "brown" greases) which originate mainly from the oil crops and fats. Recovered cooking and waste oil volumes come nowhere near meeting current biodiesel feedstock demand while rendered animal fats production can supply only a small portion of it despite their partial displacement from exports to make soap, wax, or cosmetics elsewhere.[38]

The volume of feedstock – likely, per above, mostly food-grade or otherwise connected to the food system – that would be required for the Project represents a very significant share of current markets. Preliminary information suggests that oil crop and animal fat demand for U.S. biofuel production totaled approximately 112,000 barrels per day on average over recent years.[39] Project feedstock demand could boost this 112,000 b/d nationwide total by 43% (48,000 b/d).[40] Preliminary information further suggests that U.S. farm yields for all uses of oil crops and animal fats now tapped for biofuels totaled approximately 308,000 b/d on average over recent years.[41] Thus, by boosting total U.S. biofuel production feedstock demand to 160,000 b/d, Project feedstock demand could contribute to committing as much as 52% of total U.S. farm yield for *all* uses of these oils and fats to biofuel production.

Moreover, the Project would supply biofuels primarily to the California fuels market.[42] That could commit 16% of total U.S. farm yield for all uses of crop oils and rendered animal fats, including exports (biofuels are only one use of this yield) to California alone[43]—which

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[38] *See generally* G. Karras, *Biofuels: Burning Food?,* Community Energy resource, *available at* https://f61992b4-44f8-48d5-9b9d-aed50019f19b.filesusr.com/ugd/bd8505_a077b74c902c4c4888c81dbd9e8fa933.pdf, and sources cited therein (and accompanying these Comments).

[39] U.S. Energy Information Administration (EIA). Monthly Biodiesel Production Report, Table 3. Inputs to biodiesel production; www.eia.gov/biofuels/biodiesel/production/table3.xls. This 112,000 b/d estimate is based on all data from Jan. 2018–Oct. 2020 from this table. Data were converted from mass to volume based on a specific gravity relative to water 0.916 for the combined lipid feedstocks.

[40] NOP at 2. The project percentage boost over existing biofuel production is from 48,000 b/d, divided by that 112,000 b/d existing production.

[41] This 308,000 b/d estimate is from two sources. First, data were taken from the U.S. Department of Agriculture (USDA) "Oil Crops Data: Yearbook Tables." *See* https://www.ers.usda.gov/data-products/oil-crops-yearbook/oil-crops-yearbook/#All%20Tables.xlsx?v=7477.4. Specifically, from Oct. 2016 through Sep. 2019 average total U.S. yields were: 64.0 million pounds per day, or 8.34 million gallons per day (MGD) at a specific gravity (SG) of 0.920 for soybean oil (see i below), 4.51 MM lb/d or 0.591 MGD at 0.915 SG for canola oil (ii), 16.1 MM lb/d or 2.09 MGD at 0.923 SG for corn oil (iii), 1.42 MM lb/d or 0.185 MGD at 0.923 SG for Cottonseed oil (iv), and 8.65 MM lb/d or 1.20 MGD at 0.86 SG for tallow and lard combined (v). The mass-based yields data are from the USDA Oil Crops Yearbook tables identified in this note below, which are attached with this comment. Second, we estimated total U.S. production of other oils, predominantly used or waste cooking oils, based on data described in Zhou et al., 2020. Potential Biomass-based Diesel Production in the United States by 2032, *available from* The International Council on Clean Transportation: Beijing, Sao Paulo, Berlin, San Francisco and Washington, *at* https://theicct.org/publications/potential-biomass-based-diesel-production-united-states-2032. This preliminary estimate is provided here to underscore the need for further study of related impacts. *See* USDA Oil Crops Yearbook (OCY) data tables (i) OCY Table 5, (ii) OCY Table 26, (iii) OCY Table 33, (iv) OCY Table 20), (v) OCY Table 32.

[42] *See* October 2020 Project Description at §§ 1.0, 1.2.

[43] From 48,000 b/d of project demand for 308,000 b/d of yield as estimated based on USDA data a described above. We further note that separately, and based on another biofuel feedstock supply data base, experts commissioned by California agencies found that California may already use its share of low-carbon biofuel feedstocks. *See* Mahone et al., 2020. *Achieving Carbon Neutrality in California;* PATHWAYS Scenarios Developed for the California Air Resources Board. Draft. Energy+Environmental Economics Inc.: San Francisco, CA; and Mahone et al., 2018. *Deep Decarbonization in a High Renewables Future, Updated Results from the California PATHWAYS Model;* CEC-500-2018-012. Final Project Report prepared for the California Energy Commission by Energy+Environmental Economics Inc.: San Francisco, CA.

exceeds the U.S. per capita yield of these oils and fats for all uses.[44] Thus, project feedstock demand would disproportionately commit resources to California that other states and nations now use in their food systems.

2. Use of Large Volumes of Food System Oil Could Have Significant Impacts on Food Markets that the DEIR Must Analyze

Given the high volumes of oils connected to the food system likely to be used as feedstock for the Project, the Project would compete with other uses of oil crops and the food systems they support—and would compete at unprecedented scale, given its currently unparalleled size. This competition would risk raising food-grade commodity prices and hence food prices, with an associated cascade of impacts on persons and communities suffering from food insecurity. Indeed, the price of soybean oil – currently used in biofuel production – is already "spiraling."[45] Currently available documents concerning the Project, including the Application, do not mention this issue despite its importance to environmental review.

Additionally, beyond impacts on the market for the particular feedstock used, spillover effects of project-driven price increases would affect other parts of the food system. We eat many types of food, and choose which to eat, based in part on what costs us more to buy. People may buy and consume more palm oil when soy oil gets more expensive. Similarly, manufacturers can adjust their recipes to use another crop for lipid, triacylglycerol (TAG) or fatty acid inputs, as prices for one type of crop oil increase. This fungibility among various oil crop products means that their prices are significantly if not wholly linked. Thus, project demand for one type of oil crop feedstock could increase food system prices not only for that crop but others as well. There are observed links between rising prices for one oil crop in one country and expanding production of another oil crop somewhere else.[46]

Accordingly, it is imperative, in providing a full evaluation of Project impacts, that the DEIR evaluate all effects of use of potential food-grade feedstocks on food prices, food insecurity, ILUC, biodiversity, and the food system overall. The analysis should include economic modeling of food price impacts of various possible food-system feedstock choices, taking into account the fungibility of food commodities. The modeling needs to take into

[44] Importing biofuel feedstock from another state or nation which is needed there to help decarbonize its economy could make overreliance on biofuels to help decarbonize California's economy counterproductive as a climate protection measure. Accordingly, expert advice commissioned by state agencies suggests limiting the role of biofuels within the state's decarbonization mix to the state's per capita share of low-carbon biofuel feedstocks. *See* Mahone et al. 2020 and 2018. On this basis, given California and U.S. populations of 39.5 and 330 million, respectively, California's total share of U.S. farm production (for all uses) of plant oils and animal fats which also are used for biofuels would be approximately 12%. As described in the note above, however, the project could commit 16% of that total U.S. yield (for all uses) to biofuels produced at Rodeo alone.

[45] USDA FAS.

[46] *See* S. Searle, "How rapeseed and soy biodiesel drive oil palm expansion," July 2017 (Searle 2017). The International Council on Clean Transportation: Beijing, Sao Paulo, Berlin, San Francisco and Washington, *available at https://theicct.org/publications/how-rapeseed-and-soy-biodiesel-drive-oil-palm-expansion;* Sanders et al., "Revisiting the Palm Oil Boom in Southeast Asia: The Role of Fuel versus Food Demand Drivers," 2017 (Sanders et al. 2017). International Food Research Institute: Washington, D.C., *available at* https://www.ifpri.org/cdmref/p15738coll2/id/126838/filename/127049.pdf.

account global markets to the extent relevant products are internationally traded; and must consider cumulative impacts of other biofuel producers competing for food system feedstocks.

### C. Impact of Use of Fish Oil Feedstock

The Project Description lists fish oil as a potential feedstock, without specifying the type or volume that will be used. As noted in the previous section, in the absence of an enforceable limiting requirement, the DEIR must consider potential worst case environmental scenarios in evaluating impacts. In the case of fish oils, that means considering the impact of the use of a significant volume of such oils, drawn from the array of various available sources.

For the most part, biofuel producers contemplate using waste fish oil from fish processing. With respect to this source, the DEIR should evaluate whether the waste currently is recycled for any food system purpose, *e.g.*, animal feed or fertilizer, and in such case should determine the impact of a large increase in biofuel usage on food markets. Additionally, there has been some discussion in the literature of using oil from invasive fish species as biofuel feedstock.[47] To the extent this source is also contemplated, the DEIR should evaluate the impact of increased harvest of such species, including the possibility of harm from by-catch.

With respect to all fish oils, the DEIR should evaluate the environmental and human health impact of any contamination associated with fish oils that have not been processed for human consumption. Many toxic chemicals bioaccumulate in fish, concentrate in fish oils, and could be released from biorefining such feeds in significant amounts, as discussed below.

### D. Processing Emissions Should be Estimated for Each Potential Project Feedstock

It will be particularly important for the DEIR to make an appropriate array of assumptions – including worst-case assumptions – in assessing air emissions impacts of the various feedstocks and feedstock combinations that Marathon may use. This section discusses the way in which air emissions vary widely with feedstock choice, as well as reasons why certain Project air emissions may increase rather than decrease over the comparable crude refining emissions.

#### 1. Processing Biofuel Feedstock Instead of Crude Oil Can Increase Emission Intensity

As discussed above, the baseline for the Project should be set at zero, since there is currently no crude oil refining occurring at the Refinery. However, to the extent the County nonetheless chooses to look at past crude oil emissions as a frame of reference, it is important to take fully into account the manner in which processing biofuel feedstocks rather than crude feedstocks can increase certain air emissions. As discussed below, Marathon's claim that

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[47] F. Anguebes-Fransechi et al., "Physical and Chemical Properties of Biodiesel Obtained from Amazon Sailfin Catfish (*Pterygoplichthys paradalis* Biomass Oil, *Hindawi Journal of Chemistry*, Volume 2019, Article ID 7829630, 12 pages. https://doi.org/10.1155/2019/7829630.

greenhouse gas and other emissions will decrease may not be fully accurate in light of the impact of feedstock chemistry on processing.

Processing a different type of oil – including crude feedstock oils – can increase processing emissions in several ways. It can introduce contaminants that escape the new feed and pass through the refinery into the local environment. It can require more severe, more energy-intensive processing that burns more fuel per barrel, increasing combustion emissions from the refinery. At the same time, processing the new feed can change the chemistry of processing to create new pollutants as byproducts or create polluting byproducts in greater amounts. Effects of the latter two emission mechanisms underly the preliminary estimate for one pollutant, from one part of the proposed biorefining equipment, that is shown in Table 2.

These potential emissions differentials are very much a factor in assessing Project air emissions. The oxygen content of the various proposed Project feedstocks, approximately 11 wt. % (Table 2), would change the fuel processing chemistry of the Project, compared with refining petroleum crude, which has virtually no oxygen. Oxygen would be forced out of the new feed molecules by bonding it with hydrogen to make water ($H_2O$), which then leaves the hydrocarbon stream. This consumes vast amounts of hydrogen, which must be manufactured in amounts that processing requires. These "hydrodeoxygenation" (HDO) reactions are a fundamental change from petroleum refining chemistry. This new chemistry is the main reason why—despite the "renewable" label Marathon has chosen—its biorefinery could emit more carbon per barrel processed than petroleum refining.[48] That increase in the carbon intensity of fuels processing would be directly connected to the proposed change in feedstock.

[48] Hydrogen plants alone could emit 55.9–59.4 kilograms of $CO_2$ per barrel of post-project biorefinery feed, based on emissions from processing soybean oil feed at 48,000 b/d estimated in Table 2. Average U.S. petroleum refinery $CO_2$ emissions from 1999–2008 were approximately 47.4 kg/b crude feed, based on the data in Table S1 of Karras, 2010. *Environ. Sci. Technol.* 44(24): 9584 and Supporting Information. https://pubs.acs.org/doi/10.1021/es1019965

**Table 2. Impact of Project Feedstock Choice on $CO_2$ Emissions from Hydrogen Production for Marathon Project Drop-in Biodiesel: Preliminary estimates for scoping comment.**

**t/y:** metric tons/year **SCF:** standard cubic foot **b:** barrel, 42 U.S. gallons

| | Feedstock | | | Difference | |
|---|---|---|---|---|---|
| | **Tallow** [a] | **Soy oil** [b] | **Fish oil** [c] | **Soy oil–tallow** | **Fish oil–tallow** |
| **Feedstock composition** | | | | | |
| Oxygen content (wt. %) | 11.2 % | 11.0 % | 11.0 % | – 0.2 % | – 0.2 % |
| Hydrogen deficit (wt. %) [d] | 3.24 % | 3.83 % | 4.12 % | + 0.59 % | + 0.88 % |
| Propane byproduct (wt. %) [e] | 5.18 % | 5.05 % | 5.06 % | – 0.13 % | – 0.12 % |
| **Hydro-conversion demand** | | | | | |
| Hydrogen input (SCF/b feed) [f] | 1,985 | 2,353 | 2,560 | 368 | 575 |
| **Hydrogen plants feed mix** | | | | | |
| Process byproduct feed (%) [g] | 27 % | 23 % | 21 % | – 4 % | – 6 % |
| **Hydrogen plant $CO_2$ emitted at:** [h] | | | | | |
| Median for US SMR plants (t/y) [i] | 826,000 | 979,000 | 1,070,000 | 153,000 | 244,000 |
| Median for Bay Area plants (t/y) [j] | 855,000 | 1,010,000 | 1,100,000 | 155,000 | 245,000 |
| Site-specific design data (t/y) [k] | 889,000 | 1,040,000 | 1,130,000 | 151,000 | 241,000 |

**a.** Tallow composition based on data from Satyarthi et al., 2013. *Catal. Sci. Technol.* 3:70. DOI: 10.1039/c2cy20415k; Rezaei and Azizinejad, 2013. *Journal of Food Biosciences and Technology* 3: 37–40; Bitman, 1976. *In* Fat Content and Composition of Animal Products: Proceedings of a Symposium. National Academy of Sciences; https//doi.org/10.17226/22; Application B0079, Kern Oil & Refining. GREET Pathway for the Production of Renewable Diesel from Animal Tallow. Submitted to Cal. Air Res. Board 31 March 2020; Shurson et al., 2015. *Journal of Animal Science and Biotechnology* 6:10. DOI: 10.1186/s40104-015-0005-4; Altun et al., 2010. *Int. Journal of Engineering Research and Development* Vol. 2, No. 2; Phillips, 2019. Implications of Imported Used Cooking Oil as a Biodiesel Feedstock. NNFCC: Heslington, NY; Pocket Information Manual, A Buyer's Guide to Rendered Products, National Renderers Association, Inc.: Alexandria, VA. 2003. www.renderers.org. Table e. **b.** Soybean oil composition based on data from Satyarthi et al., 2013 as cited above; Phillips, 2019 as cited above; Giakoumis, 2018. *Renewable Energy* Vol. 126: 403–419. www.sciencedirect.com/science/article/abs/pii/S0960148118303689; Han et al., 2013. *Bioresource Technology* 150: 447–456. http://dx.doi.org/10.1016/j.biortech.2013.07.153; Canale et al., 2005. *Int. J. Materials and Product Technology* 24(1–4): 101–125. https://www.inderscience.com/info/inarticle.php?artid=7943; Zhao et al., 2017. *Catalysts* 7, 83. DOI: 10.3390/catal7030083; Wang, 2002. *In* Gunstone, ed., Vegetable Oils in Food Technology. Blackwell: Oxford, UK; Tulcan et al., 2008. Analysis of Physical Characteristics of Vegetable Oils. CIGR–International Conference of Agricultural Engineering, Brazil, 31 Aug–4 Sep 2008. https://www.osti.gov/etdeweb/servlets/purl/21512209. **c.** Fish oil composition based on data for Menhaden from Xie et al., 2019. *Comprehensive Reviews in Food Science and Food Safety* Vol. 18. DOI: 10.1111/1541-4337.12427; Satyarthi et al., 2013. as cited above; Gruger, E, 1967. Fatty Acid Composition of Fish Oils. U.S. Dept. of Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries: Washington, D.C. https://spo.nmfs.noaa.gov/content/circular-276-fatty-acid-composition-fish-oils. **d.** $H_2$ required to saturate the feed and remove $O_2$ from it in ideal reaction conditions.
**e.** Propane formed from the "propane knuckle" of triacylglycerol broken into fatty acids for further processing. **f.** Includes $H_2$ needed to saturate and remove $O_2$ from feed and $H_2$ lost to cracking side-reactions, escape in purge/quench gases, and solubilization in reaction products / byproducts. **g.** Based on $H_2$ content of propane by-production, and the need to account for such potential use of hydro-conversion byproducts along with methane from imported natural gas, since $CO_2$ emissions from $H_2$ reforming and shift reactions feeding propane (16.7 g $CO_2$/SCF $H_2$) exceed those from feeding methane (13.9 g/SCF). **h.** Annual emissions at Project feed rate of 48,000 b/d, comparing the same feeds in 3 sets of $H_2$ plants with varying carbon intensities:
**i.** Emission/SCF $H_2$ based on median US stand-alone methane steam reforming (SMR) $CO_2$ emission in Table S6 of Sun et al., 2019. *Environ. Sci. Technol.* 53: 7103–7113. DOI: 10.1021/acs.est.8b06197, https://pubs.acs.org/doi/10.1021/acs.est.8b06197.
**j.** Emission/SCF from median $H_2$ production combustion energy emissions based on median design production and firing (0.202 MJ/SCF $H_2$) from BAAQMD permit data for Marathon sources S-1005 and S-937 (Marathon 1HP), Air Products S-1030 and S-1031 (Marathon 2HP), Phillips 66 S-437 and S-438 (P66 1HP U110), Air Liquide sources S-1 and S-2 (P66 2HP U210), Chevron sources 4156–4158, 4170, 4171 and 4259 (Chevron HP S-4259), Chevron sources 4449, 4450, 4471, 4472 and 6021 (Chevron HP 4449/4450), Valero sources 21,22, 1010, 1061 and 1062 (Valero HP 1010 and HP 1062), PBF/Shell sources 1445 and 1505 (HP1), 1774 and 1761 (HP2) and 4160 and 4161 (HP3), burning 100% methane fuel, added to process reaction emissions based on processing byproduct along with methane feed—see data in note g. **k.** Emission/SCF from $H_2$ production combustion emissions based on Marathon and Air Products permitted design production and firing rates reported by BAAQMD (0.221 and 0.213 MJ/SCF $H_2$, respectively) burning 100% methane fuel added to process reaction emissions as in note j. This preliminary estimate assumes the Marathon-owned $H_2$ plant loads first, supplemented by the third-party Air Products $H_2$ plant "support facility" up to the 48,000 b/d design rate. Finally, to the extent that Marathon and Air Products $H_2$ plant furnaces/heaters run below design rate, the third-party Martinez Cogen support facility is assumed to supplement their steam and power needs.

Feedstock hydrogen deficit—wherein hydrogen must be added to bond with oxygen removed from feeds and with feed carbon chains converted to hydrocarbons—thus increases the hydrogen needed for the proposed HEFA[49] processing over and above the hydrogen that was needed for the crude refining that formerly took place at the Refinery. The DEIR – to the extent it considers past petroleum refining emissions in its analysis – must consider the air emissions impact of increased hydrogen use.

2. Air Emissions Impacts Vary With Different Potential Feedstocks

Crucially, feeds that the project targets, such as tallow, soybean oil, and fish oil, are hydrogen-poor to significantly different degrees. Table 2 shows this difference in weight percent, a common measure of oil feed composition. The 0.59 wt. % difference in hydrogen deficit between soy oil and tallow is why processing soy oil requires an additional 368 standard cubic feet of hydrogen per barrel of project feed. Table 2. Similarly, the 0.88 wt. % difference between fish oil and tallow requires 575 more SCF/barrel to make so-called "renewable" diesel from fish oil than to make it from tallow. *Id.*

Feedstocks that force increased hydrogen production increase project hydrogen production emissions by a proportional amount, and Marathon proposes to make that hydrogen in existing fossil fuel hydrogen plants. This hydrogen steam reforming technology is extremely carbon intensive. It burns a lot of fuel to make superheated high-pressure steam mixed with hydrocarbons at temperatures up to 1,400–1,900 ºF. And on top of those combustion emissions, its "reforming" and "shift" reactions produce hydrogen by taking it from the carbon in its hydrocarbon feed. That carbon then bonds with oxygen to form carbon dioxide ($CO_2$) that emits as well. Making the vast amounts of hydrogen needed for project processing could cause $CO_2$ emissions from project hydrogen plants alone to exceed a million tons each year, and feedstock choice would drive the magnitude of these emissions to a significant degree. *Id.*

Thus, for instance, if Marathon runs soy oil, Project hydrogen plants could emit approximately 151,000–155,000 metric tons more $CO_2$ each year than if it runs tallow. *Id.* This 151,000–155,000 t/y excess would exceed the emissions significance threshold for greenhouse gases that other EIRs in the County have used, 10,000 metric tons/year $CO_2e$,[50] by *14 times.* And if Marathon runs fish oil, another potential feedstock it has named specifically, the estimates in Table 2 suggest that Project hydrogen plants could emit 241,000–245,000 tons/year more $CO_2$ than if it runs tallow, or *24 times* that significance threshold. Thus, available evidence indicates that the choice among project feedstocks itself could result in significant emission impacts. Therefore, emissions from each potential feedstock should be estimated in the EIR.

We note that Table 2 is based in part on estimates for other hydrogen plants across the region and nation, in addition to estimates for the Project plants. This was done in an effort to use all available data to further inform the impact of feed choice on emissions. Actual process emissions from the Project would of course be from Project plants, for which the data reflects

[49] The type of drop-in biofuel technology proposed is called "Hydrotreating Esters and Fatty Acids" (HEFA).
[50] *See* Chevron Refinery Modernization Project EIR. SCH # 2001062042. 2014. City of Richmond, CA. *See* esp. pp. 4.8-11, 4.8-12, 4.8-18, 4.8-19, 4.8-24, 4.8-27, 4.8-28, 4.8-38, 4.8-70 (10,000 metric tons/yr significance threshold).

higher energy emission intensity.[51] This higher emission intensity appears consistent with the possibility of aging equipment, outdated design, or both at the Refinery, since the Marathon hydrogen plant design is a 1963 vintage.[52] The DEIR should evaluate this part of project processing emissions using data for the Marathon and Air Products hydrogen plants that would be used by the Project. Marathon should be required to provide detailed data on those plants to support this estimate.

Feedstock choices can impact other greenhouse gases as well through varying hydrogen demand. In addition to the potential for feedstock-driven increases in emissions of $CO_2$, the proposed hydrogen production would emit methane, a potent greenhouse gas that also contributes to ozone formation, via "fugitive" leaks or vents. Aerial measurements and investigations triggered by those recent measurements suggest, further, that methane emissions from hydrogen production have been underestimated dramatically.[53]

Crucially as well, making a different product slate can increase emissions from the same feedstock. This is why, for example, the California Air Resources Board estimates a different carbon intensity for refining gasoline, diesel, or jet fuel from the same crude feed. It is relevant because, although Marathon originally said that the project would target drop-in biodiesel, it could switch to target jet fuel production. Indeed, Marathon hinted recently that it may do so.[54] Available evidence suggests that targeting jet fuel instead of drop-in diesel production from the same vegetable oil or animal fat feed could increase processing emissions significantly.[55] Thus, since differences between potential project feedstocks and project products could each increase emissions independently or in combination, the DEIR should estimate emissions for each potential project feedstock for product slates targeting both diesel and jet fuel.

Finally, we note that feedstock-driven air emission impacts – from increased hydrogen production or other causes – could be significant for multiple pollutants. In addition to $CO_2$, which emits from the hydrogen plants discussed above and other refinery sources, feedstock choices could increase emissions of other pollutants, toxins, and malodorous substances.

Pollutant increases associated with fossil fuel combustion – which include increases in nitrogen oxides, particulate matter, sulfur dioxide, and polycyclic aromatic hydrocarbons, among others – result not only from the more intense hydrogen demands associated with certain

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[51] *See* combustion energies cited in notes j and k of Table 2 for Marathon (0.221 MJ/SCF $H_2$) versus other plants.
[52] BAAQMD Source S-1005. *See* Application 28789 File, submitted to the Bay Area Air Quality Management District (BAAQMD) by Tosco Corp. on 9 Sep 1982 for permits regarding this refinery now owned by Marathon. *See* esp. Form G for Source S-1005 as submitted by M. M. De Leon, Tosco Corp., on 11/12/82.
[53] Guha et al., 2020. *Environ. Sci. Technol.* 54: 9254–9264 and Supporting Information. https://dx.doi.org/10.1021/acs.est.0c01212
[54] Compare January 29, 2021 draft Project Description at 1-1 ("including renewable diesel, renewable propane, renewable naphtha, and potentially renewable jet") (*emphasis added*) with October 2020 Project Description at 1-1 ("including renewable diesel, renewable propane, and renewable naphtha"). We note in this regard that as stated in its title, the preliminary estimates in Table 2 are based on the conversion of project feedstocks into diesel, not jet fuel. Emissions from jet fuel production could be significantly higher.
[55] Seber et al., 2014. *Biomass and Bioenergy* 67: 108–118. http://dx.doi.org/10.1016/j.biombioe.2014.04.024. *See* also Karatzos et al., 2014. Report T39-T1, IEA Bioenergy Task 39. IEA ISBN: 978-1-910154-07-6. (*See* esp. p. 57; extra processing and hydrogen required for jet fuel over diesel.) https://task39.sites.olt.ubc.ca/files/2014/01/Task-39-Drop-in-Biofuels-Report-FINAL-2-Oct-2014-ecopy.pdf

feedstocks, but from the higher energy demands in addition to hydrogen reforming associated with processing certain types of feedstocks. More contaminated or difficult to pretreat feeds may require more energy in the proposed new feed pretreatment plant. Feeds that are more difficult to process may require more recycling in the same hydrotreater or hydrocracker, such that processing each barrel of fresh feed twice, for example, may double the load on pumps, compressors, and fractionators at that process unit, increasing the energy needed for processing. As another example further downstream in the Refinery, feeds that yield more difficult to treat combinations of acids and sour water as processing byproducts may need additional energy for pretreatment to prevent upsets in the main wastewater treatment system. Feeds that require more energy-intensive processing of this nature may increase combustion emissions of an array of toxic and smog-forming pollutants, including but not limited to those noted above.

Additionally, contaminants in the feedstocks themselves can be released during processing, adding to the air emissions burden. Fish oils can be contaminated with bio-accumulative lipophilic toxins such as polychlorinated biphenyls, dioxins, and polybrominated diphenyl ethers, which could be released from processing at 48,000 barrels per day in cumulatively significant amounts. So-called "brown grease" collected from sewage treatment plants can adsorb and concentrate lipophilic toxic chemicals from across the industrial, commercial and residential sewerage collection systems—disposal and chemical fate mechanisms similar to those that have made such greases notoriously malodorous.

Thus, processing emissions of multiple pollutants, including but not limited those discussed herein, should be estimated in the DEIR for each potential project feedstock and product slate, or range of product slates, proposed to be manufactured from it.

## E. Impact of Increased Biofuel Supply on Vehicle Electrification Policies

As noted above, Marathon is one of a number of crude oil producers in California and the nation turning to biofuel production in the wake of declines in crude oil refining profitability. There is the possibility, in principle, that a surfeit of biofuel production, and the resulting downward impact on price, could create market forces and structural impediments[56] that undermine California's stated aim of electrifying the transportation sector,[57] as well as the Diesel Free by 33 pledge signed by Contra Costa County, which commits the County to, *inter alia,* "Use policies and incentives that assist the private sector as it moves to diesel-free fleets and buildings."[58] The County should therefore model the impact of increased biofuel supply, from Marathon and cumulatively from other existing and reasonably anticipated biofuel producers, on fleet electrification; and assess the emissions consequences of any such impact.

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[56] For example, competition with hydrogen-fueled trucking and shipping could impede growth in solar and wind power by slowing growth in the storage of energy from those intermittent sources as hydrogen in vehicles.
[57] Executive Order N-79-20 dated September 23, 2020, *available at* https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-text.pdf.
[58] *See* https://dieselfree33.baaqmd.gov/ (landing page), https://dieselfree33.baaqmd.gov/statement-of-purpose (text of the pledge), https://dieselfree33.baaqmd.gov/signatories (signatories).

### F. Increased Transportation Impacts

The Project Description states that the use of pipelines for transport of feedstock and products will be diminished, to be replaced by surface modes of transport – vessel, rail, and truck. The October 2020 Project Description notes that "pipeline infrastructure is not well suited to the required tracking and management of renewable fuels and therefore a larger percentage of feedstock and products will be moved by surface modes (vessel, rail, & truck)"; and that "Regionally, depending on the transportation and logistical plans, rail traffic could increase to over 50 cars per day into the state for feedstock delivery."[59] This Description provides a degree of specificity concerning the anticipated shift, stating numeric estimates for volumes to be transported by pipeline that are deleted in the January 29, 2021 revised draft Project Description.[60] The revised draft January Project Description deletes the statement in the October Project Description that "pending resolution of certain regulatory program issues, all renewable products could be trucked," removing the "all" and rendering the statement more vague.[61] However, both versions make clear that, until and unless regulatory changes are put in place, surface transport will be the "primary" mode of moving feedstock and product.[62]

Transporting oils via truck, train, or marine vessel is generally known to emit more per barrel-mile and result in higher spill, fire, and explosion incident hazards than transporting oils via pipeline. Therefore, by shifting to higher-emission, higher-hazard transport modes, the project would result in higher per-barrel feedstock transportation emissions and hazards as compared with pre-COVID refinery operation. Accordingly, it is imperative that the EIR consider all potentially heightened transportation impacts and means to mitigate them, including, *inter alia* (i) increased air emissions impacts, (ii) increased spill and other hazard risks (discussed in more detail in the next subsection), and (iii) impacts on communities in proximity to transportation infrastructure.

### G. Spill and Other Risks Associated with Marine Terminal Operations

As discussed above, the Project should be treated as a new project rather than a modification of the existing crude refining operations, because the Refinery has shut down. The baseline for this project should be the current state of operation. Moreover, as also noted above, the description of "Existing Refinery Operations" as it pertains to transportation is inaccurate, as it is written in the present tense so as to suggest that such operations are currently ongoing rather that purely a description of past, pre-shutdown operations.[63]

With that in mind, marine terminal and water-based operations must be thoroughly evaluated for potential impacts as though such operations were a new project, not merely modification of existing operations. In so doing, the DEIR must consider and explore the full

[59] Project Description at 1-17.
[60] *Id.*; January 29, 2021 draft revised Project Description at 1-18.
[61] Project Description at 1-18; draft revised Project Description at 1-18.
[62] Draft revised Project Description at 1-18. As discussed in the beginning of these comments, this is an example of an issue concerning which it would be important to have clarification which version of the Project Description is accurate and current.
[63] Project Description at 1-3 – 1-4.

range of impacts from marine terminal operations, including the risk of a catastrophic oil spill, at both terminals to which the refinery has marine access.[64]

1. <u>Environmental Impacts from Marine Terminal Operations</u>

*a. Water quality impacts*

The water quality impacts from use of the Marathon marine terminals must be thoroughly examined. This includes the feedstocks transported over the marine terminals, either biofuels or petroleum products. The DEIR must examine impacts associated with the extraction or production of feedstocks, any dilution or other processing of those feedstocks, shipment to port facilities, through the loading process onto tankers and the shipping routes they take to San Francisco Bay, then to the unloading of those feedstocks and transport into the refinery, the eventual shipment of refined or reused products to end markets or extraction or production sites, and finally through to impacts from the use of end products. This lifecycle analysis must take into account global effects such as climate change and ocean acidification, as well as local water quality impacts that could have serious consequences for the communities at extraction or production sites, ports, along the shipping routes, and near the actual Project site in Martinez. This analysis must also disclose the extent to which unknowns exist, such as the lack of concrete information concerning effective marine spill cleanup methodologies for biofuels, any possible feedstock (including plant- or animal-based feedstocks) not directly prohibited by permitting documents, and the environmental impacts of such spills, and evaluate the risks taken as a result of those unknowns. Such risk evaluation must take into account any known spills of biofuel feedstocks.

Each tanker trip carries an added risk of a spill, as a reported 50% of large spills occur in open water.[65] The majority of spills, however, are less than 200,000 gallons, and most of these spills happen while in port.[66] Two types of tanker will likely be used at the marine terminals, coastal tankers, which can carry the equivalent of as much as 340,000 barrels of oil (14.3 million gallons), and coastal tank barges, which typically carry the equivalent of 50,000 to 185,000 barrels of oil, though newer models can carry as much as a coastal tanker.

California's 45-billion-dollar coastal economy has a lot to lose to any kind of spill.[67] California commercial fisheries, for instance, produced from 186-361 million pounds of fish from 2013-2015, at a value of 129-266 million dollars.[68] After the Costco Busan disaster spilled 53,000 gallons of oil into San Francisco Bay, the Governor closed the fishery, a significant portion of which was either contaminated or killed, closed more than 50 public beaches, some as

[64] The Project Description states at 1-2 – 1-3, "The Refinery has marine access through two marine terminals on the Carquinez Strait in the San Francisco Bay Delta. … The Avon Marine Terminal is located on approximately 13.3-acres of leased sovereign land in the lower Suisun Bay, approximately 1.75 miles east of the Benicia-Martinez Bridge, in unincorporated Contra Costa County. The Amorco Marine Terminal is located on approximately 14.3 acres of leased sovereign land, approximately 0.6 miles west of the Benicia-Martinez Bridge."
[65] The International Tanker Owners Pollution Federation (2016 spill statistics), p. 8.
[66] *Id.*
[67] *California Ocean and Coastal Economies*, National Ocean Economics Program (March 2015).
[68] Based on California Department of Fish and Wildlife and National Marine Fisheries Service data.

far south as Pacifica, and thousands of birds died. All told that spill resulted in more than 73 million dollars in estimated damages and cleanup costs.[69] A DEIR evaluating the environmental impacts of biofuel operations at the Marathon marine terminals must take into account the risk of an unprecedented spill of any type of feedstock that could be used at the proposed facility, or any end product transported over the marine terminals at Marathon, into San Francisco Bay or at any other point along the route transport tankers and barges will take.

A recent spill at the Phillips 66 marine terminal serves as a warning. According to press reports, "BAAQMD issued two 'public nuisance' violations to Phillips 66 for its Sept. 20, 2016 spill, which leaked oil into the bay and sent an estimated 120 people to the hospital from fumes."[70] That spill, which occurred while the Yamuna Spirit was offloading at the Phillips 66 marine terminal in Rodeo, was responsible for more than 1,400 odor complaints and a shelter-in-place order for the 120,000 residents of Vallejo, in addition to the hospital visits already mentioned.[71] In light of these concerns, Contra Costa County must consider an independent study on spill cleanup, the adequacy of existing cleanup procedures and the need for additional cleanup and restitution funds, and increased monitoring for water and air quality impacts to communities surrounding the Project, whether those communities are located in the same county or not.

Additional National Pollutant Discharge Elimination System (NPDES) effluent criteria may be needed, a possibility which must be evaluated in the proposed DEIR. Foreseeable spill rates from marine terminal activity might qualify as a discharge to waters of the United States because it is reasonably predictable that a certain number of spills will occur. With this and other water quality impacts in mind, the regional water board should at least be a responsible agency. Furthermore, different feedstock may result in a change in the effluent discharged by the refinery under their existing NDPES permit, another reason why the regional water board should at least be a responsible party.[72] The DEIR must evaluate an updated NPDES permit that reflects the changing feedstock that will result from the Project, as well as any changes in wastewater or stormwater discharges.

No reasonable mitigation or planning can be done with regard to the risk posed by the transport of feedstocks to the Refinery without specific information as to the chemical composition of the feedstocks and end products being transported. Details on the types of product expected to arrive on the tankers utilizing the marine terminals' capacity must be part of the DEIR and must be made publicly available. For instance, it is irresponsible to base risk

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[69] *See, e.g., Incident Specific Preparedness Review M/V Cosco Busan Oil Spill in San Francisco Bay Report on Initial Response Phase*, Baykeepr, OSPR, NOAA, et al. (Jan. 11, 2008).
[70] Katy St. Clair, "Supervisor Brown says 'no way' to proposed Phillips 66 expansion," Times-Herald (Aug. 5, 2017), *available at* http://www.timesheraldonline.com/article/NH/20170805/NEWS/170809877; *see also* Ted Goldberg, "Refinery, Tanker Firm Cited for Fumes That Sickened Scores in Vallejo," KQED News (June 16, 2017), *available at* https://ww2.kqed.org/news/2017/06/16/refinery-tanker-firm-cited-for-fumes-that-sickened-scores-in-vallejo/; Ted Goldberg, "Phillips 66 Seeks Huge Increase in Tanker Traffic to Rodeo Refinery," KQED News (July 27, 2017) *available at* https://ww2.kqed.org/news/2017/07/27/phillips-66-seeks-big-increase-in-tanker-traffic-to-rodeo-refinery/.
[71] Ted Goldberg, "Refinery, Tanker Firm Cited for Fumes That Sickened Scores in Vallejo," *id*.
[72] See, e.g., Project Description at 1-8 (indicating that new wastewater treatment equipment will need to be installed) and 1-12 (providing additional details on that equipment).

assessment and best practices on assessments and practices for conventional oil without at least knowing exactly what the chemical composition of feedstocks are, and how it differs from conventional oil. Biofuel feedstocks may behave differently when spilled than conventional petroleum products. As indicated above, the available scientific evidence suggests that the type of risks associated with different types of marine spills are wholly different depending on the type of substance spilled. Additional research into best management practices, spill prevention practices, and cleanup and response planning is needed before the Project's environmental impacts can be assessed.

Commenters ask that the DEIR contain and make publicly available an independent scientific study on the risks to – and best achievable protection of – state waters from spills of any substance carried to the marine terminals. The study should encompass potential spill impacts to natural resources, the public, occupational health and safety, and environmental health and safety. This analysis should include calculations of the economic and ecological impacts of a worst-case spill event in the San Francisco Bay ecosystem, along the California coast, and along the entire projected shipping route for the marine terminals.

Based on this study, the DEIR should also include a full review of the spill response capabilities and criteria for spill contingency plans and spill response organizations (OSROs) responsible for remediating spills. Commenters respectfully request that Contra Costa County include an analysis indicating whether there are OSROs currently operating in California capable of responding adequately to a spill of any substance proposed for shipment over the Marathon marine terminals. Further, the adequacy of an OSRO's spill response capability should be compared to the baseline of no action rather than to a best available control technology standard.

Commenters are not aware of any state or federal agency responsible for non-petroleum spills. This has been a major problem in the past, as spills of "mystery goo" have fouled our waters and killed wildlife. For instance, reports of a spill of an unidentified substance in 2015 stated:

> California officials are baffled by a sticky mystery — more than 200 birds have been found dead and more rescued after they became covered in an unknown gray goo-like substance. Wildlife rescuers say they've never seen anything quite like it before. The dead birds have essentially frozen to death because the sticky substance breaks down their natural insulating water barrier and causes them to rapidly lose body heat.[73]

While California has an existing system for state-funded agencies to respond to oil spills in the Bay with cleanup and wildlife rescue, they could not be activated during the 2015 spill because they were authorized to respond only to petroleum-based spills. California Senate Bill 718, a potential fix to this problem, never made it out of committee because the refinery industry objected to use of its per-barrel fees to fund cleanup of non-petroleum spills.[74] While the

[73] Abby Philip, "A mysterious gray goo has killed more than 200 San Francisco Bay birds," Washington Post (Jan. 22, 2015), *available at* https://www.washingtonpost.com/news/morning-mix/wp/2015/01/22/a-mysterious-gray-goo-has-killed-more-than-200-san-francisco-bay-birds/.

[74] *See* Peter Fimrite, "After mystery spill ravaged bay, law pushed to galvanize response," San Francisco Chronicle (March 23, 2015), *available at* https://www.sfgate.com/science/article/After-mystery-spill-ravaged-bay-law-pushed-

"mystery goo" was eventually identified "as a nonpetroleum-based oil or fat, [which]coated more than 600 birds, mostly along the Alameda, San Leandro and Hayward shorelines," no responsible party was ever identified and area nonprofits, such as International Bird Rescue, were the only ones to respond and were forced to bear the costs of the cleanup.[75] Based on this experience, current spill response protocols are not sufficient to account for the potential harm from a non-petroleum spill, and the DEIR must thoroughly document and mitigate for potential impacts.

Ships delivering to the Project would be passing through a channel that the Army Corps of Engineers has slated for reduced dredging.[76] The Project thus contemplates ship traffic through a channel that could be insufficiently dredged. The DEIR must evaluate the safety risks posed by reduced Pinole Shoal Navigation Channel Maintenance Dredging.[77] Should Contra Costa County require Marathon to dredge the channel, it must fully evaluate and disclose impacts from such dredging in its environmental analysis.

Finally, the DEIR must evaluate ship maintenance impacts. Shipping means maintenance in regional shipyards and at regional anchorages, and these impacts must be analyzed.

*b. Wildlife impacts*

Shipping causes stress to the marine environment and can thus impact wildlife. Wake generation, sediment re-suspension, noise pollution, animal-ship collisions (or ship strikes), and the introduction of non-indigenous species must all be studied as a part of the EIR process. "Wake generation by large commercial vessels has been associated with decreased species richness and abundance (Ronnberg 1975) given that wave forces can dislodge species, increase sediment re-suspension (Gabel et al. 2008), and impair foraging (Gabel et al. 2011)."[78] Wake generation must be evaluated as an environmental impact of the Project.

Acoustic impacts can also be extremely disruptive. "Increased tanker traffic threatens marine fish, invertebrate, and mammal populations by disrupting acoustic signaling used for a variety of processes, including foraging and habitat selection (e.g. Vasconcelos et al. 2007; Rolland et al. 2012), and by physical collision with ships – a large source of mortality for marine animals near the surface along shipping routes (Weir and Pierce 2013)."[79] Acoustic impacts must be evaluated as an environmental impact of the project.

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to-6151754.php; *see also* the legislative information page for SB 718, *available at* https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB718.

[75] *Id*.

[76] Marathon Martinez, Letter to U.S. Coast Guard Sector San Francisco re: Pinole Shoal Channel Emergency Dredging, Sept. 25, 2020.

[77] Memorandum for Commander, South Pacific Division (CWSPD-PD), FY 17 O&M Dredging of San Francisco (SF) Bay Navigation Channels, U.S. Army Corps of Engineers (Jan. 12, 2017) (Army Corps memo discussing deferred dredging).

[78] Green *et al*. 2017.

[79] *Id*.

Invasive species are also a dangerous side effect of commercial shipping. "Tankers also serve as a vector for the introduction of non-indigenous species (NIS) via inadvertent transfer of propagules from one port to another (Drake and Lodge 2004), with the probability of introduction depending on the magnitude and origin of shipping traffic along tanker routes (Table 1 and Figure 3; Lawrence and Cordell 2010)." Invasive species impacts must be evaluated as an environmental impact of the project.

*c. Public Trust Impacts*

The marine terminals occupy leased, filled and unfilled, public trust lands.[80] This land is California-owned sovereign land, and as a result the California State Lands Commission is a responsible party. Public trust impacts to this land and to other public trust resources must be evaluated in the DEIR.

*d. Shipping Traffic Impacts*

Additional impacts must be analyzed starting at the port where ships take on their cargos and ending at the ports they discharge it to. The DEIR should include shipping impacts to public or non-Project commercial vessels and businesses, including impacts to recreational boaters and ferries, that might experience increased delay, anchorage waits or related crowding, and navigational complexity. Such shipping traffic impact evaluations should extend to spills, air quality, marine life impacts from ship collisions, and other environmental impact evaluated by the DEIR that could impact shipping traffic.

Marathon's Project Description inaccurately portrays current shipping traffic at its two marine terminals as consisting of permit limits.[81] For instance, Marathon claims that its Avon terminal "currently serves an average of 124 vessels per year," and that its Amorco terminal "currently serves an average of 69 tanker vessels per year."[82] But both statements are based on limits stated in the Final EIRs for the wharves rather than on actual ship traffic.[83] Combined, Marathon claims that "[t]he two marine terminals currently handle approximately 160 ships per year. Under the proposed project, the two marine terminals are expected to handle a similar number of vessels."[84] In the first instance, proposed operations at the renovated refinery must be compared to current operations, which are non-existent. But even if the intent is to compare to historic operations, the comparison should be to *actual* historic operations, not to mere permit limits. Therefore, to the extent it is deemed relevant (and it is not obvious why it should be), the DEIR must document actual historic ship traffic at the marine terminals.

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[80] Project Description at 1-2 – 1-3.
[81] Project Description at 1-15 – 1-16.
[82] *Id*.
[83] *Id.* (footnotes 1 and 2).
[84] *Id.* at 1-16.

*e. Air Quality Impacts*

Tanker trips carry obvious air quality impacts from ship exhaust. These impacts must be evaluated for every mile the ships travel, and for every community along their route. Ships will not arrive at the Project terminal from out of a vacuum, and each ship using the terminal must be evaluated.

*f. Construction or Expansion Impacts*

Marathon's Project Description states that modifications, and potentially expansion, of its two marine terminals may be necessary for this Project. "Changes would also be made to the Avon Marine Terminal to equip it for receiving renewable feedstocks for hydroprocessing **and additional petroleum-based materials for distribution**."[85] The DEIR must comprehensively address impacts from these changes, and from any additional petroleum-based production or distribution.

In the first instance, we note that any additional petroleum-based distribution is counter to the stated objectives of the Project, which is to convert the refinery to a biofuel production facility to provide renewable fuels. According to the Project Description, Project objectives include "Repurpose the Marathon Martinez Refinery to a renewable fuels production facility" and "Provide renewable fuels …." Nowhere is there an objective stated to "produce additional petroleum-based materials."[86] The DEIR must clearly state the Project objectives, and address the means by which Project components do or do not comport with those objectives.

Marathon implies that there may actually be increased use of its marine terminals upon modification. One of the modifications Marathon anticipates to its marine terminals are changes to "increase the facility's receiving capacity." Later, these changes are described as "renovation of the Avon Wharf to increase the receiving capacity will include consideration of and compliance with the current Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) regulations."[87] Likewise, for its other terminal, Marathon anticipates changes designed to facilitate "an increase to the facility's loading capacity."[88] These statements are not consistent with Marathon's claims that there will be no increased shipping as a result of this Project. Any such expansion in use must be thoroughly evaluated for all relevant factors, including increased shipping traffic over both current and historic baselines.

## H. Process Safety Risks and Other Process Impacts

The DEIR must consider and explore the fact that processing vegetable or animal-derived biofuel feedstocks in a hydrotreater or hydrocracker creates significant refinery-wide process hazards beyond those that attend crude oil refining.

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[85] *Id.* at 1-8 (emphasis added).
[86] Project Description at 1-2.
[87] *Id.*at 1-15.
[88] *Id.* at 1-16.

1. The Project could worsen process hazards related to exothermic hydrogen reactions.

This hazard is increased because the extra hydrogen that must be added to convert the new feedstock to hydrocarbon fuels generates more heat in process reactions that occur under high pressure and are prone to runaway reactions. The reaction is exothermic: it generates heat. When it creates more heat, the reaction can feed on itself, creating more heat even faster.[89]

The reason for the increased heat, and hence risk, is that the removal of oxygen from fatty acids in the biofuel feed, and saturating the carbon atoms in that feed to remove that oxygen without creating unwanted carbon byproducts that cannot be made into biodiesel and foul the process catalyst, require bonding that oxygen and carbon with a lot more hydrogen. The project would use roughly nine times more hydrogen per barrel biorefinery feed than petroleum refining needs from hydrogen plants per barrel crude.[90] Reacting more hydrogen over the catalyst in the hydrotreating or hydrocracking reactor generates more heat faster.[91] This is a well-known hazard in petroleum processing, that manifests frequently in flaring hazards[92] when the contents of high-pressure reactor vessels must be depressurized[93] to flares in order to avoid worse consequences that can and sometimes have included destruction of process catalyst or equipment, dumping gases to the air from pressure relief valves, fires and explosions. The extra hydrogen reactants in processing the new feedstocks increase these risks.[94]

2. The Project could worsen process hazards related to damage mechanisms such as corrosion, gumming, and fouling.

The severe processing environment created by the processing of new feedstocks for the Project also can be highly corrosive and prone to side reactions that gum or plug process flows, leading to frequent or even catastrophic equipment failures. Furthermore, depending on the contaminants and processing byproducts of the particular Project feedstock chosen, it could create new damage mechanism hazards or exacerbate existing hazards to a greater degree. As Chan notes:

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[89] Robinson and Dolbear, "Commercial Hydrotreating and Hydrocracking. *In* Hydroprocessing of heavy oils and residua," 2007. Ancheyta and Speight, eds. CRC Press, Taylor and Francis Group: Boca Raton, FL, pp. 308, 309.

[90] The Project could consume up to 2,560 standard cubic feet of $H_2$ per barrel of drop-in biodiesel feed processed, as shown by the evidence summarized in Table 2 herein. Operating data from U.S. petroleum refineries during 1999–2008 show that nationwide petroleum refinery usage of hydrogen production plant capacity averaged 272 cubic feet of $H_2$ per barrel crude processed. Karras, 2010. *Environ. Sci. Technol.* 44(24): 9584 and Supporting Information. (*See* data in Supporting Information Table S-1.) https://pubs.acs.org/doi/10.1021/es1019965.

[91] van Dyk et al., 2019. *Biofuels Bioproducts & Biorefining* 13: 760–775. *See* p. 765 ("exothermic reaction, with heat release proportional to the consumption of hydrogen"). https://onlinelibrary.wiley.com/doi/10.1002/bbb.1974.

[92] Flaring causal analyses, various dates. Reports required by Bay Area Air Quality Management District Regulation 12, Rule 12, including reports posted at https://www.baaqmd.gov/about-air-quality/research-and-data/flare-data/flare-causal-reports and reports for incidents predating those posted at that link.

[93] Chan, 2020. www.burnsmcd.com/insightsnews/tech/converting-petroleum-refinery-for-renewable-diesel. *See* p. 2 ("emergency depressurization" capacity required).

[94] van Dyk et al., 2019 as cited above at 765 ("heat release proportional to the consumption of hydrogen"); and Chan, 2020 as cited above at 2 ("significantly more exothermic than petroleum diesel desulfurization reactions").

> Feedstock that is high in free fatty acids, for example, has the potential to create a corrosive environment. Another special consideration for renewable feedstocks is the potential for polymerization ... which causes gumming and fouling in the equipment ... hydrogen could make the equipment susceptible to high temperature hydrogen attack ... [and drop-in biodiesel process] reactions produce water and carbon dioxide in much larger quantities than petroleum hydrotreaters, creating potential carbonic acid corrosion concerns downstream of the reactor.[95]

3. Project hazard impacts are foreseeable despite current and proposed safeguards.

There are procedures to control the reaction heat, pressure – including through process operation measures such as quenching between catalyst beds in the reactor and careful control of how hot the reactor components get, how much hydrogen is added, how much feed is added, and how long the materials remain in the reactor, preventing hot spots from forming inside of it, and intensive monitoring for equipment damage and catalyst fouling. While these measures should be considered in the DEIR as mitigation, they are imperfect at best, and rely on both detailed understanding of complex process chemistry and monitoring of conditions in multiple parts of the process environment. Both those conditions are difficult to attain in current petroleum processing, and even more difficult with new feedstocks with which there is less current knowledge about the complex reactions and how to monitor them when the operator cannot "see" into the reactor very well during actual operation; and cannot meet production objectives if production is repeatedly shut down in order to do so.

In fact, the measures described above are "procedural safeguards,"[96] the least effective type of safety measure in the "Hierarchy of Hazard Control"[97] set forth in California process safety management policy for petroleum refineries.[98] Marathon itself added automated shutdown control logic systems to these procedural safeguards before it closed the refinery, but these are "active safeguards,"[99] the next least effect type of safety measure in the Hierarchy of Hazard Control. Marathon now proposes to replace some of the vessel and piping linings of its old Refinery equipment, which would be repurposed for the Project, with more corrosion-resistant metallurgy—an added layer of protection in those parts of the biorefinery where this proposal might be implemented, and a tacit admission that potential hazards of processing its proposed feedstock are a real concern. But again, this type of measure is a "passive safeguard,"[100] the next least effective type of measure in the Hierarchy of Hazard Control, after procedural and active

[95] Chan, 2020 as cited above at 3.
[96] Procedural safeguards are policies, operating procedures, training, administrative checks, emergency response and other management approaches used to prevent incidents or to minimize the effects of an incident. Examples include hot work procedures and emergency response procedures. California Code of Regulations (CCR) § 5189.1 (c).
[97] This Hierarchy of Hazard Control ranks hazard prevention and control measures "from most effective to least effective [as:] First Order Inherent Safety, Second Order Inherent Safety, and passive, active and procedural protection layers." CCR § 5189.1 (c).
[98] We note that to the extent this state policy, the County Industrial Safety Ordinance, or both may be deemed unenforceable with respect to biorefineries which do not process petroleum, that only further emphasizes the need for full analysis of Project hazard impacts and measures to lessen or avoid them in the DEIR.
[99] Active safeguards are controls, alarms, safety instrumented systems and mitigation systems that are used to detect and respond to deviations from normal process operations; for example, a pump that is shut off by a high-level switch. CCR § 5189.1 (c).
[100] See CCR § 5189.1 (c).

safeguards. Marathon has not proposed more effective first or second order inherent safety measures for the specific Project hazards identified above.

Importantly, and perhaps most telling, Marathon proposes to repurpose the flare system of its closed refinery for this Project. Rather than eliminating underlying causes of safety hazard incidents or otherwise preventing them, refinery flare systems are designed to be used in procedures that minimize the effects of such incidents.[101] This is a procedural safeguard, again the least effective type of safety measure.[102] The flares would partially mitigate incidents that, in fact, are expected to occur if the Project is implemented, but flaring itself causes acute exposure hazards. And as incidents caused by underlying hazards that have not been eliminated continue to recur, they can eventually escalate to result in catastrophic consequences.

4. Significant hazard impacts appear likely based on both site-specific and global evidence.

Site-specific evidence shows that despite current safeguards, hydrogen-related hazards frequently contributed to significant flaring incidents, even before the worsening of hydro-conversion intensity and hydrogen-related process safety hazards which could result from the Project. Causal analysis reports for significant flaring from unplanned incidents indicate that at least 49 hydrogen-related process safety hazard incidents occurred at the Refinery from January 2010 until it closed on 28 April 2020.[103] This is a conservative estimate, since incidents can cause significant impacts without environmentally significant flaring, but still represents, on average, another hydrogen-related hazard incident at the Refinery every 77 days. Sudden unplanned or emergency shutdowns of major hydro-conversion or hydrogen production plants occurred in 43 of these reported incidents.[104] Such sudden forced shutdowns of *both* hydro-conversion and hydrogen production plants occurred in 12 of these incidents.[105] In other words, incidents escalated to refinery-level systems involving multiple plants frequently—a foreseeable consequence since both hydro-conversion and hydrogen production plants are susceptible to upset when the critical balance of hydrogen production supply and hydrogen demand between them is disrupted suddenly. In three of these incidents, consequences of underlying hazards included fires at the Refinery.[106]

Catastrophic consequences of hydrogen-related hazards are foreseeable based on industry-wide reports as well as site-specific evidence. For example:

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[101] *See* BAAQMD regulations, § 12-12-301. Bay Area Air Quality Management District: San Francisco, CA.
[102] *See* Procedural Measure and Hierarchy of Hazard Control definitions under CCR § 5189.1 (c) in the notes above.
[103] Flaring causal analyses, various dates. Reports required by Bay Area Air Quality Management District Regulation 12, Rule 12, including reports posted at https://www.baaqmd.gov/about-air-quality/research-and-data/flare-data/flare-causal-reports and reports for incidents predating those posted at that link.
[104] Flaring causal analyses as cited above. Hydro-conversion includes hydrotreating and hydrocracking.
[105] *Id.*
[106] Flaring causal analyses as cited above. *See* reports for incidents starting 13 May 2010, 17 February 2011 and 17 April 2015.

- Eight workers are injured and a nearby town is evacuated in a 2018 hydrotreater reactor rupture, explosion and fire;[107]
- A worker is seriously injured in a 2017 hydrotreater fire that burns for two days and causes an estimated $220 million in property damage;[108]
- A reactor hydrogen leak ignites in a 2017 hydrocracker fire that causes extensive damage to the main reactor;[109]
- A 2015 hydrogen conduit explosion throws workers against a refinery structure;[110]
- Fifteen workers die, and 180 others are injured, in a series of 2005 explosions when hydrocarbons flood a distillation tower during an isomerization unit restart;[111]
- A vapor release from a valve bonnet failure in a high-pressure hydrocracker section ignites in a major 1999 explosion and fire at the Chevron Richmond refinery;[112]
- A worker dies, 46 others are injured, and the surrounding community is forced to shelter in place when a release of hydrogen and hydrocarbons under high temperature and pressure ignites in a 1997 hydrocracker explosion and fire at this Refinery;[113]
- A Los Angeles refinery hydrogen processing unit pipe rupture releases hydrogen and hydrocarbons that ignite in a 1992 explosion and fires that burn for three days;[114]
- A high-pressure hydrogen line fails in a 1989 fire which buckles the seven-inch-thick steel of a hydrocracker reactor that falls on nearby Richmond refinery equipment;[115]
- An undetected vessel overpressure causes a 1987 hydrocracker explosion and fire.[116]

Since the Project's new feedstock and process system are thus known to worsen the underlying conditions that can become (and have become) root causes of hazardous incidents, the DEIR must thoroughly evaluate and mitigate these risks. The DEIR must evaluate, *inter alia,* the impact of the proposed new feedstock and production process on worker safety, community safety, and upset frequency and impacts (including increased flaring). In this regard, the DEIR analysis should ascertain whether Marathon intends to decommission any part of its former Martinez refinery flaring infrastructure under its proposed Project.

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[107] Process Safety Integrity, *Refining incidents;* https://processsafetyintegrity.com/incidents/industry/refining ; _see_ Bayernoil Refinery Explosion, January 2018.
[108] Process Safety Integrity as cited above; _see_ Syncrude Fort McMurray Refinery Fire, March 2017.
[109] Process Safety Integrity as cited above; _see_ Sir Refinery Fire, January 2017.
[110] Process Safety Integrity as cited above; _see_ Petrobras (RLAM) Explosion, January 2015.
[111] Process Safety Integrity as cited above; _see_ BP Texas City Refinery Explosion, March 2005.
[112] Process Safety Integrity as cited above; _see_ Chevron (Richmond) Refinery Explosion, March 1999.
[113] Process Safety Integrity as cited above; _see_ Tosco Avon (Hydrocracker) Explosion, January 1997.
[114] Process Safety Integrity as cited above; _see_ Carson Refinery Explosion, October 1992.
[115] Process Safety Integrity as cited above; _see_ Chevron (Richmond) Refinery Fire, April 1989.
[116] Process Safety Integrity as cited above; _see_ BP (Grangemouth) Hydrocracker Explosion, March 1987.

### I. Site Decommissioning Impacts

A substantial portion of the currently operative crude oil refining equipment at the Refinery would not be operated at the site if the Project is built. The idled equipment would include the Crude Unit, Gasoline Hydrotreater, Alkylation Unit, Fluidized Catalytic Cracking Unit, Reformers, and Delayed Coker.[117] This equipment, and the ground on which it is located, is likely to be highly contaminated from years of operation of the refinery.

Various oil companies refined oil at the Martinez site since 1913,[118] roughly 60 years before the environmental protection wave of the early 1970s, and through waves of toxic gasoline additives—tetraethyl lead and then MTBE, from the 1930s through the early 2000s—and refinery releases to land persist to this day.

Marathon should be made to specify, for inclusion in the DEIR analysis, what it plans to do with the idled equipment, and how it will address site contamination in fallowed portions of the refinery. Additionally, California's policy of vehicle electrification and the Diesel Free by '33 pledge are both clear indicators that the Project will have a finite commercial lifetime, and that such lifetime can be estimated with reasonable accuracy based on these policies, coupled with available information concerning competing biofuel production operations (existing and planned). Accordingly, to the extent the Project is evaluated from a baseline other than zero (its current shutdown condition), and treated instead as a switch from crude oil refining, it should be understood for purposes of the DEIR as setting in motion a series of events that will culminate with the now-predictable end date for biofuel production at the site, and hence the predictable need for decommissioning and cleanup. The DEIR would in such case need to evaluate decommissioning impacts as part of its analysis.

## V. The DEIR Should Consider Project Alternatives That Would Minimize Impacts

At the heart of CEQA analysis is a discussion of available project alternatives. CEQA provides that "[t]he purpose of an environmental impact report is to identify the significant effects of a project on the environment, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided." It further provides that "The purpose of an environmental impact report is ... to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project." *Laurel Heights Improvement Assn. v. Regents of University of California*, 47 Cal.3d 376 (1988), citing Public Resources Code §§ 21002.1(a), 21061.

Accordingly, it will be essential for the DEIR to evaluate an array of alternatives that minimize the environmental impacts of the Project, as well as mitigating any impacts that remain. In particular, we propose that the DEIR consider an alternative that involves generating hydrogen from electrolysis rather than the fossil-fuel driven process used prior to shutdown of the Refinery.

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[117] Project Description at 1-8.
[118] *California Refinery History;* California Energy Commission: Sacramento, CA. https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/californias-oil-refineries/california-oil.

The Project would repurpose and use the No. 1 and No. 2 hydrogen plants at the Refinery for its biofuels production process.[119] These are fossil fuel hydrogen production plants that use steam reforming to strip hydrogen from hydrocarbon feeds at extremely high reaction temperatures, and are fed and fueled by purchased natural gas and hydrocarbon byproducts of refining processes at the facility. This steam reforming process is extremely carbon-intensive, emitting roughly nine times more $CO_2e$ than its hydrogen output by weight. That high carbon intensity is compounded by the project's use of a hydro-conversion technology (HEFA), which requires roughly nine times more hydrogen per barrel of biofuel feed than petroleum refining requires from on-purpose hydrogen production per barrel of crude.[120] This choice of technology could make hydrogen production the predominant source of direct $CO_2e$ emission from the biofuel refinery, and make Project processing more carbon intensive than petroleum refining.[121]

At least one commercialized technology, electrolysis, can supply zero-emission hydrogen using renewable electricity. Producing hydrogen by electrolysis is a proven technology. It has been used commercially in other sectors and reportedly was commercialized before fossil fuel steam reforming was used to produce hydrogen for oil refining. Coupling electrolysis with renewable electricity to produce hydrogen from water, often called "green" hydrogen but more transparently labeled "renewable-powered electrolysis" hydrogen, is a zero-emission alternative to the carbon-intensive hydrogen production the Project proposes to repurpose and use for biofuel refining. Energy sector projects are underway elsewhere to build renewable-powered electrolysis plants now.[122] Renewable-powered electrolysis could replace the most carbon-intensive biofuel refining process step proposed by the Project. The DEIR should therefore include use of renewable-powered electrolysis as an alternative to minimize Project impacts.

Using this proven alternative for biofuel refining would eliminate the vast majority of direct $CO_2e$ emissions from project biofuel refining, cut the carbon-intensity of combustion fuels the project would produce significantly, and lessen or avoid other project impacts that appear likely to be significant if the project proceeds as proposed.

Crucially as well, Marathon would not be locked into prolonged biofuel refining as lower carbon hydrogen-fueled freight and shipping expands per state policy, because it could shift the zero-emission hydrogen asset to fueling that cleaner transportation expansion. Solar and wind energy storage in the hydrogen produced at the Refinery, then stored in those vehicles, would further support state renewable goals.

We note, briefly, some additional factors the County should consider as it evaluates this proven zero-emission alternative in the DEIR. First, Marathon appears to have ample room to

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[119] October 2020 Project Description at Figure 1-5.

[120] The project could require roughly ten times as much on-purpose hydrogen to be produced per barrel of refinery vegetable oil feedstock as crude refining, as noted in subsection IV. H. above—up to 2,560 cubic feet per barrel of biorefinery feedstock oil, as compared with 272 cubic feet per barrel running the average petroleum crude refined nationwide from 1999-2008.

[121] Project hydrogen plants alone could emit more $CO_2$ per barrel of biorefinery feed than the average U.S. refinery emits per barrel of crude, as discussed in subsection IV. B.

[122] K. Adler, "Europe Emerges as Leader in Hydrogen Economy. IHS Markit," December 15, 2020 (Adler 2020) *available at* https://ihsmarkit.com/research-analysis/europe-emerges-as-leader-in-hydrogen-economy.html.

build it within the Refinery site.[123] Second, scheduled project construction could offer the simplest, cheapest, and most environmentally effective time to install this climate-safe alternative.[124] Third, as the project could be supported by enormous public investment,[125] and the hydrogen in hydrocarbon fuels it produces would be renewable with this alternative,[126] the value and renewable energy purpose of this potential public investment must be weighed in assessing the economic sustainability of the project with and without this alternative. Fourth, the extent to which solar and wind power prices could continue to fall relative to those of fossil fuels[127] should be considered in evaluating the economics of renewable-powered electrolysis hydrogen over the time when the project could operate, and partially switch to hydrogen vehicle fueling. Lastly, noting again that crucial pivot from biofuels combustion to decarbonized electrification of transportation which zero-emission hydrogen here could support, its ability to avoid potentially enormous cumulative future health costs must be considered in evaluating this alternative.[128]

For all of these reasons, public review of the project will demand a pivotal choice between fossil fuel and renewable hydrogen-based fuel production. This choice could be locked in beyond the duration of project operation. As it involves the second largest biofuel refining project contemplated anywhere, this choice likely will set precedents for future biofuel projects. Whether future biofuel refineries will be more carbon-intensive or less carbon-intensive than the petroleum refineries they are meant to replace could hang in the balance. Robust evaluation of the hydrogen alternative—renewable-powered electrolysis—will be essential to accurate environmental review of the project.

## VI. Conclusion

For all of the reasons explained herein, it is essential that the DEIR set forth a thoroughgoing discussion of all potential impacts of the Project, as well as an accurate baseline against which to measure those impacts. We remain available at the emails listed below to discuss our concerns and recommendations with County staff.

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[123] See site maps given in the NOP and Project Description. The County should compare electrolysis footprints elsewhere with on-site project alternative plant siting options.

[124] "It is simpler, less expensive, and more effective to introduce inherently safer features during the design process of a facility rather than after the process is already operating." CSB, 2013, *Interim Investigation Report, Chevron Richmond Refinery Fire* at page 40. U.S. Chemical Safety Board: Washington, D.C. https://www.csb.gov/file.aspx?Documentid=5913.

[125] State LCFS, federal RIN credits and federal tax breaks to "renewable" diesel fuel projects are reported to reach $3.30 per gallon. *See* Tepperman, J., *Refineries Renewed;* East Bay Express, September 16, 2020, *available at* https://www.eastbayexpress.com/oakland/refineries-renewed/Content?oid=30619701. At its full 48,000 b/d (2.02 million gallons/day) capacity, $3.30/gallon is $2.4 billion annually.

[126] Hydrogen would be the most abundant element in the fuels that the project could produce.

[127] Adler 2020.

[128] In fact Zhao and colleagues found that even "[a]fter subtracting the cost [of renewable electric alternatives to biofuels], the net monetized benefit of the electrification-focused pathway still exceeds that of the renewable fuel-focused pathway, indicating that a cleaner but more expensive decarbonization pathway may be more preferable in California." Zhao et al., "Air Quality and Health Cobenefits of Different Deep Decarbonization Pathways in California" (2019). *Env. Sci. Technol.* 53:7163–7171. DOI: 10.1021/acs.est.9b02385 (Zhao 2019).

Thank you for consideration of these comments.

Very truly yours,

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