

## **Attachment to Notice**

# **2011 Integrated Energy Policy Report – Transportation Fuel Infrastructure Issues to be Discussed at the May 11, 2011 Workshop**

This is a supplement to the notice of a Transportation Committee workshop on transportation fuel infrastructure issues. This provides further details about questions and issues that staff has identified regarding the workshop topics and includes information about ongoing staff work from which Energy Commission forecasts of future transportation fuel infrastructure requirements are developed. It is staff's intent that this document will facilitate discussion and participation by stakeholders at the meeting as well as identify new issues.

### Marine Terminals

Marine terminals in California are essential to receive imports of petroleum and renewable fuels, as well as periodic exports of feedstocks and transportation fuels. The adequacy of existing facilities to handle growing volumes of petroleum and renewable imports over the forecast period is a key area of interest to the Energy Commission. Staff uses demand forecasts for finished petroleum and renewable fuels in conjunction with different refinery and biorefinery production capacity expansion scenarios to estimate a range of potential future imports at marine terminals. Issues associated with ongoing and expanded use of marine terminals that will be covered in the workshop include:

- Status of Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) – Where does the industry stand regarding compliance? Will any facility operators decide to shut down their wharves? What is the outlook for potential impacts, if any, on operations as companies upgrade terminals?
- Renewable fuel import infrastructure – Will importers be able to use existing marine terminals or do they need marine berths with different characteristics (types and size of storage tanks) to help ensure an adequate capability to receive greater quantities of renewable fuels and feedstocks? Are sufficient and suitable import facility sites available given potential competition for space at ports?
- Petroleum fuel import infrastructure – What are the industry's expectations about refinery capacity? What is the likelihood and potential scale of contraction in California due to forecasted declining gasoline demand? Will existing or planned petroleum fuel import infrastructure be adequate for projected fuel import requirements?

## Distribution Terminals and Biorefineries

There are over 50 terminals throughout California that are used to distribute transportation fuels destined for retail stations. The adequacy of existing facilities to distribute growing volumes of renewable fuels over the forecast period is also a key interest for the Energy Commission. Federal and state regulations, including the Renewable Fuel Standard (RFS2) and the California Low Carbon Fuel Standard (LCFS), will increase the minimum use levels for both ethanol and alternative diesel fuel. How quickly the system adapts to these changing requirements will ultimately determine if any constraints develop. Discussion of the following items will assist the Energy Commission in anticipating issues that might come up during this transition to increased use of renewable fuels:

- Factors that can impact the forecast of demand for ethanol and alternative diesel fuels include:
  - The RFS2 outlook is assumed to be a baseline for renewable fuel use obligations in the nation and state. Will there be sufficient quantities of traditional and advanced forms of renewable fuel available to meet these blending obligations? What portion of the advanced obligation is anticipated to be sourced from foreign facilities? What are the specific types and magnitude of barriers that are preventing cellulosic biofuels from achieving commercial-scale production? What is a more realistic time line for development of significant commercial-scale domestic cellulosic production capability? Should the RFS2 targets be revised in light of the challenges and difficulties associated with cellulosic biofuels? For example, can and should the RFS2 limit on corn-based ethanol be changed? If so, to what level and what would be the potential implications for corn and ethanol co-product markets? Since the increasing RFS2 mandated levels for biofuels has shifted ethanol use from a discretionary to non-discretionary market setting, should the Volumetric Ethanol Excise Tax Credit (VEETC) be eliminated? If so, what would be the potential change in market prices for producers and blenders?

The LCFS being developed by the California Air Resources Board (ARB) is assumed to increase the quantities of advanced ethanol and alternative diesel fuels to levels higher than the minimum obligations of the federal RFS2 and to require renewable fuels with lower carbon intensities. What volumes of these fuels are needed, of what types, and over what period of time will they be required? If significant quantities of advanced biofuels from Brazil are anticipated to meet the LCFS obligations, what would be the potential incremental costs to obligated parties and consumers? Should the current import tariff and ad valorem tax for imported ethanol (outside the Caribbean Basin Initiative countries) be changed or rescinded?

- Factors that can impact the forecast of ethanol and alternative diesel fuel imports and distribution within the state include:
  - What is the status of biofuel receiving capacity for California via rail and/or marine shipments? What has been accomplished over the last couple of years? What is the status of projects and capabilities outside of California to receive and transfer biofuels from foreign sources to rail cars? Would this newly-created infrastructure be able to supply the majority of California's forecasted needs for foreign-sourced biofuels?
  - The mix of ethanol sources could shift from a primarily corn-based origin to another that uses different feedstocks that have lower carbon lifecycle impacts as companies comply with California's LCFS. Does this shift mean that sugar-cane derived ethanol imports will increase? Will California's ethanol production capacity grow and also use increasing quantities of non-corn feedstocks such as biomass waste, sorghum, sugar cane, and other crops? If so, how would imports change?
  - The economic health of the ethanol and biodiesel industry has been problematic over recent years. Existing California biorefineries have reopened or plan to, but the outlook for future expansions of biorefinery production capacity could be less optimistic due to lack of access to capital and potential uncertainty associated with the optimal type of renewable fuels that should be targeted for production to help meet the market demand for both the RFS2 and the LCFS. What are the expectations for increased in-state capacity for biofuel production facilities? What economic, technical, and regulatory hurdles must be overcome before substantial quantities of ethanol and biodiesel from California facilities with the appropriate carbon intensities can enter the market?
  - What are the expectations for renewable hydrocarbon ("drop-in") fuel production, either produced in-state or imported from other sources? What are the capital and operating costs associated with producing these blendstocks? What are the feedstock sources and availability limitations? How would significant contributions from these blendstocks impact refinery, pipeline, and terminal operations?

### Retail Refueling and Recharging Infrastructure

There are nearly 10,000 retail stations throughout the state that are used to dispense nearly 20 billion gallons of transportation fuels per year. The increased use of renewable and alternative fuels will require more retail station infrastructure to help ensure sufficient distribution throughout capability – acknowledging that supply and

vehicle populations are necessarily interrelated elements. The following issues and questions will be discussed at the workshop.

- The U.S. Environmental Protection Agency has waived the E10 blend limit to allow blends to E15 in model year cars from 2001 and newer, although litigation and technical issues may constrain this proposed increase. In particular, what are the specific state regulatory challenges that would have to be overcome in California, Nevada, and Arizona? What are the anticipated steps and respective timing? If ethanol use in gasoline were to increase to 15 percent by volume in California and the neighboring states, how much additional time would pass before the new E15 blend limit would be encountered?
- The availability of E85 dispensers is expected to continue growing, but there are several issues that can impact the overall need for and availability of E85 retail dispensers. The RFS2 and LCFS requirements may increase the blending obligations for ethanol beyond the current blending limit of 10 percent by volume in gasoline. Expanded use of ethanol beyond the E10 limit will have an impact on estimates of the timing and need for expanded E85 dispensers in California.
  - What are automotive issues associated with the use of higher ethanol blends and can they be overcome?
  - Will the population of flexible fuel vehicles (FFVs) be adequate to accommodate the minimum demand levels anticipated for E85? What is the outlook and commitment to availability of flex-fuel vehicles as a portion of new vehicles over the near and medium-term?
  - What are other types of automotive developments that could possibly conflict with a scenario of greatly expanded FFV availability, such as higher Corporate Average Fuel Economy standards, stricter evaporative emission control requirements, increased electric vehicle sales obligations, and greater consumer demand for Plug-in Hybrid Vehicles?
  - Are there permitting or new source review issues that present challenges to expansion of E85 retail dispensers?
  - What is the actual range of costs associated with the installation of new E85 dispensers for facilities that have been upgraded over the last couple of years?
  - What is the breakdown of funding used to accomplish these upgrades between local grants, state grants, federal grants, venture capital and other sources?
  - Does the business model used for installation of new E85 dispensers include additional revenue streams from RFS2 renewable Identification Number (RIN) credits and/or LCFS credits? If so, how important is this revenue to overall profitability? How will the value of the credits influence final retail prices?
  - What type of retail pricing requirements would provide the greatest level of consumer information (e.g. gasoline-gallon equivalent pricing)?

- Issues that can impact availability of alternative diesel fuel at retail stations.
  - Underground storage tank (UST) concerns – What is the status of allowing biodiesel blends in excess of B5? What are the barriers and what is the anticipated timing for enabling B20 use in USTs?
  - What is the current limit of biodiesel use for light, medium, and heavy-duty diesel engines? If less than B20, can this warranty issue be resolved?
  - How will the ARB's recent analysis associated with biodiesel and increased NO<sub>x</sub> issues impact the use of biodiesel in California? What options remain for obligated parties to comply with the diesel fuel portion of the LCFS?
  
- Issues that can impact availability of natural gas, propane, or hydrogen refueling at retail locations.
  - Compressed and liquefied natural gas capacity and throughput issues
  - Aging of natural gas fleet fueling equipment
    - What are the historic patterns for the purchase and use of natural gas vehicles and how will future trends in vehicle usage influence the need for infrastructure?
  - Availability of propane supplies
  - Hydrogen storage, metering, dispensing, and related regulatory issues
    - What is the status of the clean vehicle trigger for hydrogen retail availability? What minimum number of hydrogen-fueled vehicles and anticipated timing will necessitate the investment in hydrogen retail fueling infrastructure?
    - How will fuel quality standards for fuel cell hydrogen be developed and how will they affect distribution and marketing?
    - What are the current costs associated with the installation of hydrogen fueling at an existing retail site, as well as for a new retail facility dedicated solely to hydrogen vehicles? How will differences in hydrogen fueling infrastructure affect the length of the location's usage and the return on investment requirements?
    - What are the costs for hydrogen vehicles compared to non-hydrogen makes and models?
    - What are the processes used to produce hydrogen fuel and what are the associated costs prior to the application of any taxes? What are the current and proposed levels of fuels taxation for hydrogen? What are the implications, if any, of these different levels of fuel taxation for federal and state revenue for highway and road maintenance?
    - What limitations and opportunities exist for the installation of hydrogen refueling infrastructure at existing retail sites?
  
- Issues that can affect availability and impacts of electric recharging.

- What are the estimated costs, timing, vehicle population requirements, and distribution of recharging infrastructure between private residential and public facilities? What is adequate recharging infrastructure coverage over the next twenty years? How will electricity be charged to consumers and at what rates?
- The geographic distribution of electric-drive vehicles may vary considerably - What consequences might this have for distribution infrastructure requirements? What portion of new electric vehicles sold into the market will be sold to fleets as opposed to residential-based consumers?
- How will the large scale introduction of plug-in hybrids and full electric vehicles affect recharging infrastructure and what is needed to ensure that incremental vehicle electricity demand occurs off-peak?
- To what extent will the forecasted installation and use of public-charging stations impact peak electricity demand loads?
- How will multifamily dwellings and homeowners without attached garages charge plug-in electric vehicles? What will be the charging rates for these consumers?
- What methods will be used to maximize the use of charging infrastructure given varying charging patterns and times? Are there methods to manage occupation of the charging spots to ensure maximum station availability?

### Crude Oil Import and Storage

A preliminary crude oil import forecast by staff will be presented along with a description of new facilities being developed to accommodate an expected increase of crude oil imports, especially for Southern California. The outlook for crude oil imports is a consequence of declining California crude oil production and the degree to which refiners expand their ability to process crude oil at their facilities. Responses to the following questions will assist staff in determining the state's crude oil import requirements.

- Status of Berth 408 crude oil import facility project – When will this facility be operational?
- Status of Pier Echo petroleum and renewable fuels marine terminal – When will this facility be operational and what capabilities and capacity will it have?
- At what rate of growth will refinery capacity to process crude oil expand or decline in the state? What is the likelihood of some degree of refinery consolidation in California and how would such a scenario impact the forecast of crude oil and transportation fuel imports?

## Petroleum Product Pipelines

Transportation fuels are delivered to Nevada and Arizona primarily through a petroleum product pipeline distribution infrastructure. The transportation fuel demand outlook for these states, along with any regional and California pipeline expansion projects, could impact the forecast of pipeline exports from California. Changing levels of fuel exports to these states are one of the factors that can have an important impact on the level of imports into California of finished fuels and their associated blending components. Discussion of the following proposals will enable the Energy Commission to better understand the potential impacts.

- How will new regional petroleum product pipeline projects impact the forecasted level of pipeline exports from this state?
  - The Holly Corporation and Sinclair project, a Utah-to-Las Vegas petroleum product pipeline, could decrease the need for California sources of transportation fuels for Southern Nevada.
    - What is the status, timing, and anticipated initial pumping volumes for this new pipeline?
    - To what extent will this new supply source decrease the forecasted exports of petroleum-based transportation fuels to Southern Nevada from California?
  - Operational changes to the Longhorn Pipeline have also shifted flows of gasoline and diesel fuel from California to Arizona. Are these shifts temporary or will Southwestern pipeline infrastructure operations continue to move away from a greater dependence on California-sourced transportation fuels?
    - Are there any fuel specification changes that may be necessary in response to the lower ozone standard proposed by the U.S. Environmental Protection Agency? If so, how might these changes impact supply and availability of transportation fuels for Arizona and Nevada such that the forecasted export of transportation fuels to these states will be impacted?

## Other Issues

Are there any other issues that could impact petroleum, renewable, and alternative fuel infrastructure, especially over the near to mid-term?