

DOCKETED	
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Clean Transportation Program

Staff Workshop on the Hydrogen Station Capacity Evaluation (HySCapE) Tool and Hydrogen Station Data Collection and Reporting

(Public Comments to Draft Solicitation Concepts Issued January
23, 2019)

Art Rosenfeld Hearing Room
September 27, 2019



Agenda

Welcome	9:00 a.m.
HySCapE Overview	9:10 a.m.
Questions and Answers	9:30 a.m.
Station Nameplate Capacity and 1 Hour Fueling Capacity	9:45 a.m.
Question and Answers	10:00 a.m.
Break	10:15 a.m.



Agenda

Operation and Maintenance Data	10:30 a.m.
Questions and Answers	11:30 a.m.
Wrap-up and Public Discussion	11:45 a.m.
Adjourn	12:00 p.m.



Welcome

- Facilities and Logistics
- In case of emergency
- Diversity Survey

<https://www.surveymonkey.com/r/NLQTRJG>



Commitment to Diversity

The Energy Commission adopted a resolution on April 8, 2015, to firmly commit to:

- Increase participation of women, minority, disabled veteran and LGBT business enterprises in program funding opportunities.
- Increase outreach and participation by disadvantaged communities.
- Increase diversity in participation at Energy Commission proceedings.
- Increase diversity in employment and promotional opportunities.



Commitment to Diversity

Fairness – Increase funding accessibility to all Californians.

Inclusion – Small businesses make up a significant portion of the U.S. economy.

Job Creation – Projects can create jobs for residents of the under-served communities.

Diversity of Ideas – Great ideas occur in a variety of areas.

Diversity in Communities' Needs – Needs vary widely from one area to the next (air quality, socioeconomic, etc.).



Workshop Purpose

- To provide an overview of the HySCapE model
- To provide a forum to discuss the comments about the HySCapE model and some new ideas
- To provide a forum to discuss the comments about data collection and reporting and some new ideas



HySCapE Overview

Sam Sprik

National Renewable Energy Laboratory (NREL)



Station Nameplate Capacity and 1 Hour Fueling Capacity

Mark Johnson

California Energy Commission



Station Nameplate Capacity

Minimum 24-hour fueling capacity:

- “Number of kg Mass Dispensed” is equal to or greater than 225 kg per fueling position
- The “Time Between Fills” reflects the capability of the station design that fully meets the Chevron Friday Vehicle Demand Profile
- The HySCapE output file displays the “number of kg Mass Dispensed” equal to “number of kg Mass Dispensed at SOC limit”
- Enter “0” for the “Number of deliveries per day” in the HySCapE input file



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Component	Value	Units	Description
Delivery	0	logical [0,1]	Liquid delivery taxation
Production	0	logical [0,1]	On-site production taxation
Storage	1	logical [0,1]	High pressure storage taxation
Storage	0	logical [0,1]	Medium pressure storage taxation
Storage	1	logical [0,1]	Low pressure storage taxation
Production	0	%	Storage level trigger for production
Production	0	kWh/kq	Production unit efficiency
Production	0	kq/h	Flow production rate
Production	0	MPa	output max pressure
Storage	0.42	m3	Volume high pressure (HP) bank %HITRF: 0.342925
Storage	0	m3	Volume medium pressure (MP) bank %HITRF: 1.3224;
Storage	3	m3	Volume low pressure (LP) bank %Default: 2.6108;
Storage	0	m3	Volume of liquid (LQ) bank (22.7125 - 6000 gallons)
Storage	4	#	Number of high pressure banks
Storage	0	#	Number of medium pressure banks
Storage	9	#	Number of low pressure banks
Storage	0	#	Number of liquid banks
Storage	45	MPa	Minimum HP bank pressure (Mixture whole number or adjust pressure lookup function, Must adjust dispensing algorithm if min P _{hp} is less than or equal to 0)
Storage	0	MPa	Minimum MP bank pressure (Mixture whole number or adjust pressure lookup function, Must adjust dispensing algorithm if min P _{mp} is less than or equal to 0)
Storage	0	MPa	Minimum LP bank pressure
Storage	90	MPa	Maximum HP bank pressure
Storage	0	MPa	Maximum MP bank pressure
Storage	50	MPa	Maximum LP bank pressure
Storage	0	MPa	Vaporizer output pressure (must be greater than MP compressor minimum) (www.linkedin.com/in/qinorinq.com.kkqatfimaqaz/P_3_4_e_10_1504pi227_5776.pdf?v=)
Storage	1	logical [0,1]	High pressure bank Eligible for fill, 1-eligible, 0-not eligible
Storage	0	logical [0,1]	Medium pressure bank Eligible for fill, 1-eligible, 0-not eligible
Storage	1	logical [0,1]	Low pressure bank Eligible for fill, 1-eligible, 0-not eligible
Compressor	1	logical [0,1]	All low compressor to fill bank which are used for dispensing?, 1-yes, 0-no.
Compressor	1	#	Number of high pressure compressors
Compressor	0	#	Number of medium pressure compressors
Compressor	5	MPa	Minimum High pressure compressor (HPc) pressure
Compressor	0	MPa	Minimum Medium pressure compressor (MPc) pressure
Compressor	90	MPa	Maximum HP c pressure
Compressor	0	MPa	Maximum MP c pressure
Compressor	75	kq/h	HP c maximum flow rate
Compressor	0	kq/h	MP c maximum flow rate
Compressor	0	kq/h	Liquid pump maximum flow rate
Compressor	0	kq/h	Vaporizer maximum flow rate
Dispenser	20	degC	Ambient temperature
Dispenser	1	#	Maximum number fueling partitions capable of simultaneous fill
Delivery	200	kq	Mass per delivery
Delivery	0	#/day	Number of deliveries per day
Delivery	6	#	Number of banks delivering hydrogen
Delivery	35	MPa	Pressure of delivery truck
Delivery	1	kq/r	Delivery flow rate
Delivery	3600	s	Delivery truck dwell time
Delivery	1	selector [1,2]	Fuel delivery type, 1-gaseous, 2-liquid
Liquid	0	kq/r	Liquid truck delivery rate to storage

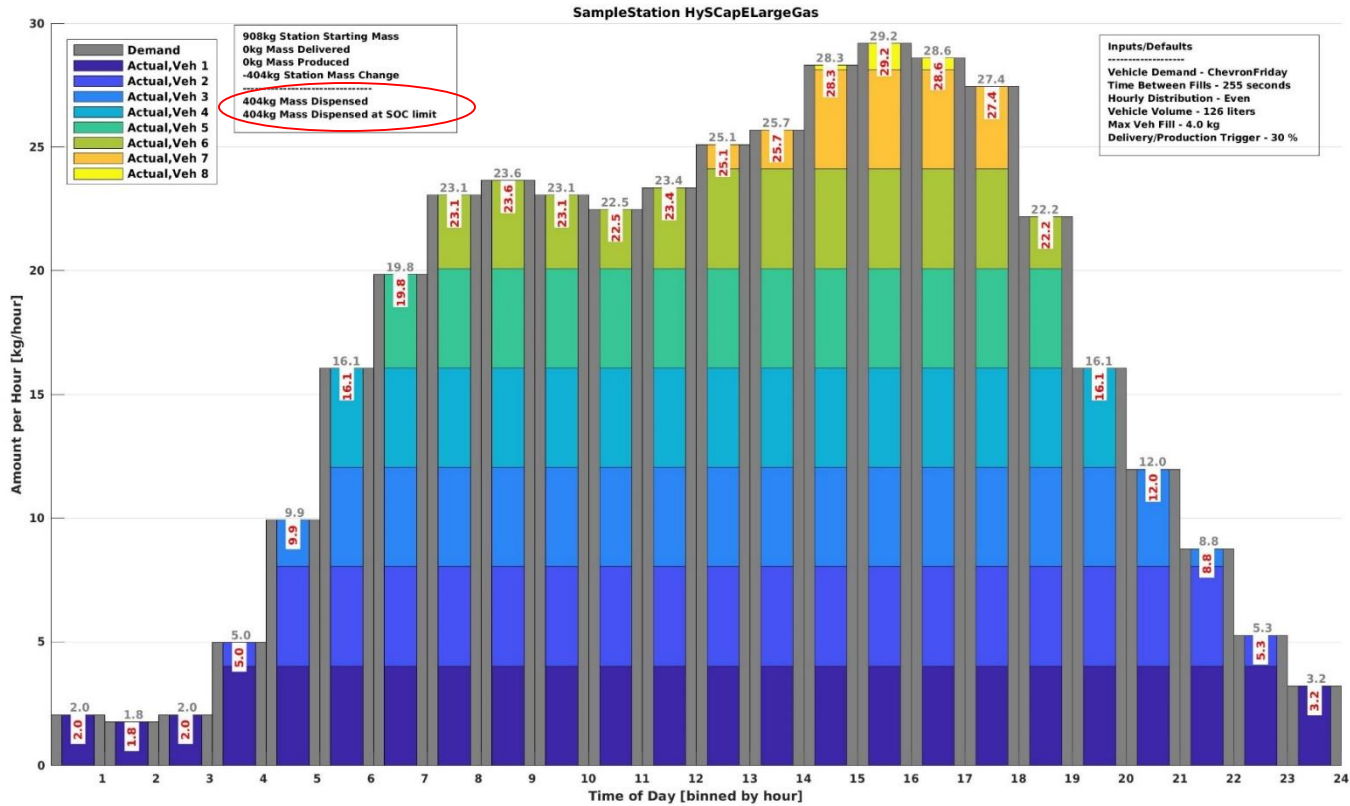


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Delivery	0	kg	Mass per delivery
Delivery	0	#/day	Number of deliveries per day
Delivery	0	#	Number of banks delivering hydrogen
Delivery	0	MPa	Pressure of delivery truck
Delivery	0	kg/s	Delivery flow rate
Delivery	3600	s	Delivery truck dwell time
Delivery	1	selector [1,2]	Fuel delivery type, 1=gaseous, 2=liquid



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908kg Station Starting Mass

0kg Mass Delivered

0kg Mass Produced

-404kg Station Mass Change

404kg Mass Dispensed

404kg Mass Dispensed at SOC limit



1 Hour Fueling Capacity

- Each fueling position meets the minimum 1 hour fueling capacity of 28 kilograms, completing seven 4-kilogram H70-T40 fills
- The HySCapE output file shows the “number of kg Mass Dispensed at SOC limit” is equal to or greater than 28 kilograms per fueling position

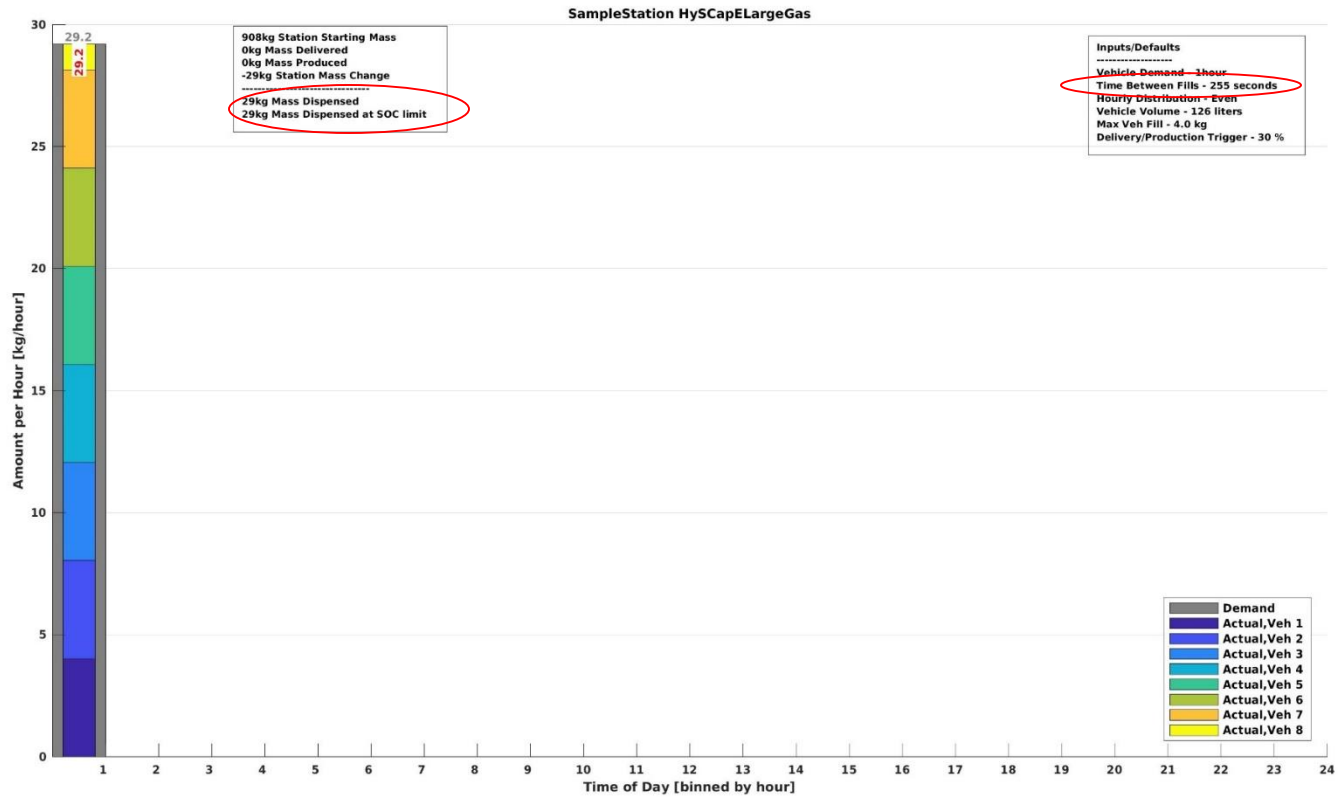


1 Hour Fueling Capacity

- When running the HySCapE model, “Time Between Fills” is between 120-255 seconds
- The output file displays the “number of kg Mass Dispensed” equal to “number of kg Mass Dispensed at SOC limit”



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908kg Station Starting Mass
0kg Mass Delivered
0kg Mass Produced
-29kg Station Mass Change

29kg Mass Dispensed
29kg Mass Dispensed at SOC limit

Inputs/Defaults

Vehicle Demand - 1hour
Time Between Fills - 255 seconds
Hourly Distribution - Even
Vehicle Volume - 126 liters
Max Veh Fill - 4.0 kg
Delivery/Production Trigger - 30 %



Questions?



Break



Operation and Maintenance Data

Mark Johnson

California Energy Commission



Operation and Maintenance Data

- The concept is to use the NREL Data Collection Tool
- The concept is to submit an NREL Data Collection Tool every quarter
- NREL Data Collection Tool includes:
 - HySCapE Input File
 - Fuel Log
 - Safety & Leak Checks
 - Maintenance



Questions?



Public Discussion



Previous Workshop on HySCapE

- Previous July 18, 2018 HySCapE Workshop can be found at:
 - https://ww2.energy.ca.gov/altfuels/notices/2018-07-20_workshop/2018-07-20_ARFVTP_Workshop.mp4



Contact Information

Please send questions and comments by
October 7, 2019 at 5 P.M. PDT to:

California Energy Commission

Docket Office, MS-4

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