

Walk-through the MSM demo

- i. Start MSM
 - a. Go to <http://h2-msm.ca.sandia.gov> (slide 5)
 - b. Click the 'Current users' green button
 - c. Login (slide 6)
- ii. Generate an MSM run
 - a. GUI: define pathway (slide 7)
 - i. Set the year → 2020
 - ii. Delivery → pipeline
 - iii. Feedstock/Process → Woody biomass (advanced)
 - iv. City Population → 400000 (=400K, roughly South Bend Indiana area)
 - v. Region → IN; →St. Joseph
 - vi. Click the 'Get' (red) button
 - vii. Resource cost → Industrial natural gas
 - viii. Click the 'Apply' button
 - ix. Fill-in the Title field
 - x. Fill-in the Description field
 - b. GUI: detailed inputs
 - i. Click the Edit Detailed Inputs button
 - ii. Click on Feedstock, Utilities group (slide 8)
 - iii. Click on Utilities, co-products subgroup
 - iv. Select Source of natural gas utility price: its value has been automatically set to equal the regional (for St. Joe county, IN) value
 - v. Instructions-example on how to use Detailed Inputs in the GUI (slide 9) in setting the H2 dispensing options
 1. Click-open the Dispensing Forecourt group
 2. Click-open the Gaseous H2 Dispensing subgroup
 3. Select the Dispensing Mode item of the subgroup
 4. Below, from the Value drop-down menu, select 350 psi Cascade
 5. Click OK and the option selected option appears as the value for the Dispensing Mode item in the subgroup
 - vi. In the a similar manner, other detailed inputs can be modified; the remaining items will keep their default values
 - c. Submit the MSM job (still slide 9). Without clicking the Edit Required Inputs button (clicking it brings the user back to the left side of the screen and resets the detailed items to their default values), submit the job: click the Submit button. Now the information about the pathway and detailed input values is sent to the MSM server and an MSM job runs
 - i. Submission notice appears with the run number; click OK (slide 10). If an error message appears instead, a mis-communication between local computer and

the MSM server occurred and in this case we recommend closing the GUI windows and re-logging into the MSM web-site again

- ii. Simulations menu appears (slide 11). It shows that the submitted job is a 'new' job; when the server will finish running the job, its status will change to 'complete'
 1. Click the OK button and the Submissions menu disappears
 2. Click the View submissions button and the Submissions menu is back on
 3. When the job is complete, the user will receive an email notification
- d. MSM job results
 - i. In the Submissions menu (slide 12) select the MSM run of interest (its status should be 'complete')
 - ii. Clicking the Get Info button shows job description (that the user filled in when defining the job before its submission)
 - iii. Clicking the Download Results button will prompt to save the run_number.csv file to the location specified by the user (slide 13).
 - iv. Open the run_number.csv file on your computer (slide 14) – it shows the complete list of parameters acquired in the MSM run
 - v. On the Submissions menu (back to slide 12), click the Download Input File button – it will prompt the user to save the complete list of XML instructions for the MSM. Slide 15 shows the contents of the input XML file. This file can be later uploaded by the user to the server to repeat the same run
 - vi. (slide 16) in the Submissions menu, click the View output button. It brings the Fuel Cycle chart for the selected MSM run (slide 17).
 - vii. On the bottom right corner of the chart screen, in the dropdown View menu, select Vehicle Cycle Chart (slide 18).
 - viii. In the same bottom right corner dropdown View menu, select the Output Tree option (slide 19).
 1. Click-open the pathway defining parameters group – it will display the required inputs
 2. Click-open, for example, the vehicle group – it will display the lower level sub-groups
 3. Click-open the location sub-group and it will display the location-related vehicle characterization parameters
 - ix. Click the OK button of the active window and this will close the display results and bring the user back to the inputs GUI menu
- iii. Generate a multiparameter run (probe sensitivities)
 - a. (Slide 20) Click the Multi-param tab in the upper-left corner (it will run MSM several times with only several parameters different from run to run; we'll call these *variable* input parameters)
 - b. Choose the input variable parameters (slide 21)
 - i. Click Add data item button
 - ii. Select an item (effectiveIrrSource)

- iii. Similarly, add pipelineTransLengthSource (slide 22)
 - iv. Set the values: 0.1(=10% IRR) and 60 (miles distance to city)
 - v. Click the Add run button and set the values for the second run 0.12(=12%) and 30 (mi)
- c. Select outputs of interest (slide 23)
 - i. Click the Add output item and select pathwayLevelizedCost
 - ii. Repeat for pathwayEfficiency and wtwGHG
 - d. Submit the multiparameter run: click Submit button, then OK in the Submission notice
 - e. It will bring the Submissions menu (similar to slide 12). When the job is complete, the user will receive an email notification, and the job status in the Submissions menu will change to 'complete'
 - f. In the submissions menu, select the multiparameter job (571 in our case) when its status is 'complete' and click the Download results button (as on slide 12)
 - g. It will prompt the user to save the CSV file, its contents (the user should open the saved CSV file to see them) look different for a multiparameter run (slide 24) as compared to a single run output (slide 14).