Verify Schema Change Log of Changes Made for Light-Duty Greenhouse Gas

Verify Schema Change Log of Changes Made for Light-Duty Greenhouse Gas

Compliance Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

VERIFY
Schema Change Log of changes made for
Light Duty Greenhouse Gas

Purpose

This document identifies XML schema modifications to the VERIFY Light Duty (LD) and Fuel Economy (FE) family of schemas to include Green House Gas (GHG) data elements. There are 2 basic types of modifications. Modifications that involve internal file structure, having no impact to the logical data model, were made to bring the new schema in sync with the current schema development paradigm per EPA XML data standard [GD2-E]. These changes involve only the location and organization of the schema components that comprise the logical data model and some changes to data type names. Modifications that involve the addition of new schema components to included GHG data were also made. Because the current schema development paradigm for certain kinds of data validation has moved the validation to business rules, hence making the schema much less susceptible to data requirement changes, new GHG data elements have more generic data types. Because some of the GHG data elements have been reused from the original LD schemas, these LD data elements now also have more generic data types. This basically relaxes the schema validation of the LD instances of these data elements but also requires that any business rules written for data validation for the GHG instances additionally be applied to the LD instances as well.

LD Modified XML Files

EN_VER_LD_CD_CertificationDataSubmissionRootElement_v0.9.xsd
EN_VER_LD_CFT_DecisionInformationSubmissionRootElement_v0.9.xsd
EN_VER_LD_FE_CAFESubmissionRootElement_v0.9.xsd
EN_VER_LD_FE_LabelSubmissionRootElement_v0.9.xsd
EN_VER_LD_FE_RoadLoadSubmissionRootElement_v0.9.xsd
EN_VER_LD_FE_SharedDataElements_v0.9.xsd
EN_VER_LD_ SharedDataElements_v0.9.xsd

Individual XML Schema File Modifications

For new and modified data elements, the annotation following the data element name references the corresponding data element identifiers in the DR spreadsheet. Note that individual data elements may be used in more locations in the schemas than defined in the DR spreadsheet.

EN_VER_LD_CD_CertificationDataSubmissionRootElement_v0.9.xsd

- The following changes were made to TestGroupIdentificationDetails[Type]:
  - Data element HeavyDutyGreenhouseGas2bOr3Indicator [Y/N (LD-TG6.5)] was added with cardinality (1,1).

EN_VER_LD_CFT_DecisionInformationSubmissionRootElement_v0.9.xsd

- The following changes were made to DecisionInformationDetails[Type]:

o Data element HighSellingVehicleForFuelEconomyLabelingPurposesIndicator [Y/N/NA (LD-DI25.15)] was added with cardinality (1,1).

EN_VER_LD_FE_CAFESubmissionRootElement_v0.9.xsd

- The following changes were made to FootprintInformationDetails[Type]:
  o Data element
    FinalModelYearGreenhouseGasTemporaryLeadTimeAllowanceAlternativeStandardProductionN
    umber [0 to 9,999,999 (FE-CA194)] was added with cardinality (0,1).

- The following changes were made to ModelTypeDetails[Type]:
  o Data element TemporaryLeadtimeAllowanceAlternativeStandardIndicator [Y/N (FE-CA156)]
    was renamed to TemporaryLeadTimeAllowanceAlternativeStandardIndicator [Y/N (FE-CA156)]
    having cardinality (0,1).

- The following changes were made to ReformedStandardDetails[Type]:
  o Data element
    ManufacturerUnroundedGreenhouseGasTemporaryLeadTimeAllowanceAlternativeStandardValu
    e [0.0 to 9999.9 (FE-CA195)] was added with cardinality (0,1).
  o Data element ManufacturerUnroundedReformedStandardValue [0.0000 to 999.9999 (FE-CA22.3)] was renamed to ManufacturerUnroundedReformedTruckCAFEStandardValue [0.0000
    to 999.9999 (FE-CA22.3)] having cardinality (0,1).
  o Data element ManufacturerUnroundedReformedDomesticPassengerVehicleCAFEStandardValue
    [0.0000 to 999.9999 (FE-CA199)] was added with cardinality (0,1).
  o Data element ManufacturerUnroundedReformedImportPassengerVehicleCAFEStandardValue
    [0.0000 to 999.9999 (FE-CA203)] was added with cardinality (0,1).

EN_VER_LD_FE_LabelSubmissionRootElement_v0.9.xsd

- The complex data type CarbonDioxide1ValueDetailsType was added as follows:
  o Data element CityCarbonDioxide1Value [0.0 to 9,999.9 (FE-GL226,232,249,252,268,271)] was
    added with cardinality (1,1).
  o Data element HighwayCarbonDioxide1Value [0.0 to 9,999.9 (FE-GL227,233,250,253,269,272)]
    was added with cardinality (1,1).
  o Data element CombinedCarbonDioxide1Value [0.0 to 9,999.9 (FE-GL228,234,251,254,270,273)]
    was added with cardinality (1,1).

- The complex data type CarbonDioxideNumberDetailsType was added as follows:
  o Data element CityCarbonDioxideNumber [0 to 9,999 (FE-GL235,240)] was added with
    cardinality (1,1).
  o Data element HighwayCarbonDioxideNumber [0 to 9,999 (FE-GL236,241)] was added with
    cardinality (1,1).
  o Data element CombinedCarbonDioxideNumber [0 to 9,999 (FE-GL201,242)] was added with
    cardinality (1,1).

- The following changes were made to ModelTypeDetails[Type]:

- o The cardinality of data element ActualModelSalesAreaIdentifier [2 characters (FE-GL106.2)] was changed from (1,∞) to (0,∞).

- The following changes were made to LabelDetails[Type]:
  - o Data element MediumDutyPassengerVehicleOnlyIndependentCommercialImporterIndicator [Y/N (FE-GL200)] was added with cardinality (1,1).
  - o Data element VoluntaryLowerMPGLabelIndicator [Y/N (FE-GL85)] was renamed to VoluntaryLowerFuelEconomyLabelIndicator [Y/N (FE-GL85)] having cardinality (1,1).
  - o Data element FuelEconomyRatingNumber [1 to 10 (FE-GL203)] was added with cardinality (0,1).
  - o Data element GreenhouseGasRatingNumber [1 to 10 (FE-GL205)] was added with cardinality (0,1).
  - o Complex data element SubConfigurationSmogRatingDetails[Type] was added with cardinality (0,∞).
  - o Data element AmountSavedOverFiveYearsNumber [0 to 99,999 (FE-GL210)] was added with cardinality (0,1).
  - o Data element IncreasedAmountSpentOverFiveYearsNumber [0 to 999,999 (FE-GL212)] was added with cardinality (0,1).
  - o Data element ManufacturerVoluntaryHigherCarbonDioxideCombinedNumber [0 to 9,999 (FE-GL276)] was added with cardinality (0,1).

- The complex data element SubConfigurationSmogRatingDetails[Type] was added as follows:
  - o Data element TestGroupName [12 characters, optional . after 5th and before last (FE-IV6,GL13.5,126,CA34,RL4,GL207)] with cardinality (1,1).
  - o Data element ManufacturerCalculatedSmogRatingNumber [1 to 10 (FE-GL208)] was added with cardinality (1,1).
  - o Data element EPACalculatedSmogRatingNumber [1 to 10 (GL-209)] was added with cardinality (0,1).

- The following changes were made to FuelEconomyLabelDetails[Type]:
  - o Complex data element EPAGeneratedFuelEconomyDetails[Type] was changed to EPAGeneratedFuelEconomyLabelDetails[Type].

- The following changes were made to EPAGeneratedFuelEconomyLabelDetails[Type]:
  - o Data element EPAFuelEconomyRatingNumber [1 to 10 (FE-GL204)] was added with cardinality (0,1).
  - o Data element EPAGreenhouseGasRatingNumber [1 to 10 (FE-GL206)] was added with cardinality (0,1).
  - o Data element EPAAmountSavedOverFiveYearsNumber [0 to 99,999 (FE-GL211)] was added with cardinality (0,1).
  - o Data element EPAIncreasedAmountSpentOverFiveYearsNumber [0 to 999,999 (FE-GL213)] was added with cardinality (0,1).
  - o Data element DiscrepancyBetweenManufacturerAndEPACalculatedLabelValuesIndicator [Y/N (FE-GL274)] was added with (0,1).
  - o Complex data element CalculatedFuelUsageAndEconomyDetails[Type] was removed.

- o Data element EPAFiveCycleRoundedAdjustedFinalLabelCombinedCarbonDioxideNumber [0 to 9,999 (FE-GL248)] was added with cardinality (0,1).

- The following changes were made to BaseLevelDetails[Type]:
  - o The cardinality of complex data element FuelUsageDetails[Type] was changed from (1,∞) to (0,∞).

- The following changes were made to FuelUsageAndEconomyDetails[Type]:
  - o Complex data element FuelEconomyValueUnitDetails[Type] was added with cardinality (1,∞).
  - o Complex data elements ManufacturerUnroundedUnadjustedModelTypeCarbonDioxideDetails and ManufacturerFiveCycleUnroundedAdjustedModelTypeCarbonDioxideDetails, both with type CarbonDioxide1ValueDetailsType, were added with cardinality (0,1).
  - o Complex data element ManufacturerFiveCycleRoundedAdjustedModelTypeCarbonDioxideDetails, with type CarbonDioxideNumberDetailsType, was added with cardinality (0,1).
  - o Data element ManufacturerCalculatedAdjustedCombinedModelTypeFuelConsumptionValue [0.0 to 999.9 (FE-GL214)] was added with cardinality (0,1).
  - o Data element ManufacturerVoluntaryHigherCombinedFuelConsumptionValue [0.0 to 999.9 (FE-GL275)] was added with cardinality (0,1).
  - o The cardinality of complex data element ManufacturerCityLabelDetails[Type] was changed from (1,1) to (0,1).
  - o The cardinality of complex data element ManufacturerHighwayLabelDetails[Type] was changed from (1,1) to (0,1).
  - o Complex data element ElectricVehicleFuelEconomyDetails[Type] has been added with cardinality (0,1).
  - o Complex data element EPACalculatedFuelUsageAndEconomyDetails[Type] has been added with cardinality (0,1).

- The complex data element FuelEconomyValueUnitDetails[Type] was added as follows:
  - o Data element FuelEconomyValueUnitIdentifier [Enumeration of 3 identifiers (FE-GL90)] was added (relocated from FuelUsageAndEconomyDetails) with cardinality (1,1).
  - o Complex data elements ManufacturerUnroundedUnadjustedModelTypeDetails and ManufacturerFiveCycleUnroundedAdjustedModelTypeDetails, both with type FuelEconomy4ValueDetailsType, were added with cardinality (1,1).
  - o Complex data element ManufacturerFiveCycleRoundedAdjustedModelTypeDetails, with type FuelEconomy3ValueDetailsType, was added with cardinality (1,1).
  - o Complex data element ManufacturerVoluntaryLowerDetails, with type FuelEconomyNumberlDetailsType, was added with cardinality (0,1).

- The following changes were made to FuelUsageDetails[Type]:
  - o The cardinality of complex data element ManufacturerUnroundedUnadjustedBaseLevelDetails[Type] was from (1,1) to (0,1).
  - o The cardinality of complex data element ManufacturerFiveCycleUnroundedAdjustedBaseLevelDetails[Type] was from (1,1) to (0,1).
  - o Complex data element EPACalculatedBaseLevelFuelUsageDetails[Type] has been added with cardinality (0,1).

- The complex data element ElectricVehicleFuelEconomyDetails[Type] was added as follows:
    - Data element ChargeTimeHoursAtTwoHundredFortyVoltsNumber [Hours, 0 to 99 (FE-GL216)] was added with cardinality (0,1).
    - Data element ChargeTimeHoursAtOneHundredTwentyVoltsNumber [Hours, 0 to 99 (FE-GL217)] was added with cardinality (0,1).
    - Complex data element PlugInHybridElectricVehicleFuelEconomyDetails[Type] was added with cardinality (0,1).

- The complex data element EPACalculatedFuelUsageAndEconomyDetails[Type] was added as follows:
    - Complex data element EPAFuelEconomyValueUnitDetails[Type] was added with cardinality (0,∞).
    - Complex data elements EPAUnroundedUnadjustedModelTypeCarbonDioxideDetails and EPAFiveCycleUnroundedAdjustedModelTypeCarbonDioxideDetails, both with type CarbonDioxide1ValueDetailsType, were added with cardinality (0,1).
    - Complex data element EPAFiveCycleRoundedAdjustedModelTypeCarbonDioxideDetails, with type CarbonDioxideNumberDetailsType, was added with cardinality (0,1).
    - Data element EPACalculatedAdjustedCombinedModelTypeFuelConsumptionValue [0.0 to 999.9 (FE-GL215)] was added with cardinality (0,1).
    - Data element EPAPlugInHybridElectricVehicleCompositeGasolineElectricityCombinedMilesPerGallonEquivalentNumber [0 to 9,999 (FE-GL222)] was added with cardinality (0,1).
    - Data element AnnualFuelCostNumber [US$, 0 to 9,999 (FE-GL81,81.1)] was added with cardinality (1,1).

- The complex data element EPAFuelEconomyValueUnitDetails[Type] was added as follows:
    - Data element FuelEconomyValueUnitIdentifier [Enumeration of 3 identifiers (FE-GL90)] was added with cardinality (1,1).
    - Complex data elements EPAUnroundedUnadjustedModelTypeDetails and EPAFiveCycleUnroundedAdjustedModelTypeDetails, both with type FuelEconomy4ValueDetailsType, were added with cardinality (0,1).
    - Complex data element EPAFiveCycleRoundedAdjustedModelTypeDetails, with type FuelEconomy3ValueDetailsType, was added with cardinality (0,1).
    - Complex data element EPAFiveCycleRoundedAdjustedFinalLabelDetails, with type FuelEconomy3ValueDetailsType, was added with cardinality (0,1).

- The complex data element EPACalculatedBaseLevelFuelUsageDetails[Type] was added as follows:
    - Complex data elements EPAUnroundedUnadjustedBaseLevelFuelEconomyDetails and EPAFiveCycleUnroundedAdjustedBaseLevelFuelEconomyDetails, both with type FuelEconomy4ValueDetailsType, were added with cardinality (0,1).
    - Complex data elements EPAUnroundedUnadjustedBaseLevelCarbonDioxideDetailsand EPAFiveCycleUnroundedAdjustedBaseLevelCarbonDioxideDetails, both with type CarbonDioxide1ValueDetailsType, were added with cardinality (0,1).

- The complex data element PlugInHybridElectricVehicleFuelEconomyDetails[Type] was added as follows:

- o Data element TotalDrivingDistanceInMilesNumber [Miles, 0 to 9,999 (FE-GL218)] was added with cardinality (0,1).
- o Data element CompositeGasolineElectricityCityMilesPerGallonEquivalentNumber [Miles per gallon, 0 to 9,999 (FE-GL219)] was added with cardinality (0,1).
- o Data element CompositeGasolineElectricityHighwayMilesPerGallonEquivalentNumber [Miles per gallon, 0 to 9,999 (FE-GL220)] was added with cardinality (0,1).
- o Data element CompositeGasolineElectricityCombinedMilesPerGallonEquivalentNumber [Miles per gallon, 0 to 9,999 (FE-GL221)] was added with cardinality (0,1).

EN_VER_LD_FE_RoadLoadSubmissionRootElement_v0.9.xsd

- The complex data element EPAGeneratedRoadLoadDetails [Type] was added as follows:
  - o Data element TotalRoadLoadHorsepowerValue [0.0 to 99.9 (FE-RL23)] was added with cardinality (1,1).

- The complex data element RoadLoadDetails[Type] was added as follows:
  - o Data element InformationProcess Code [N/C (FE-IV1,GL0.5,CA3,FT0.5,RL0.5)] was added with cardinality (1,1).
  - o Data element EPAManufacturerCode [3 characters (FE-IV2,IV-DR2,IT2,IT-DR2,GL2,10,125.5,CA0,11.5,25.1,124,FT0.7,RL1)] was added with cardinality (1,1).
  - o Data element RoadLoadIndexNumber [1 to 99,999 (FE-RL1.5)] was added with cardinality (1,1).
  - o Data element ModelYear [YYYY (FE-IV8,GL3,CA1,FT2,RL1.6,CRR)] was added was added with cardinality (1,1).
  - o Data element FuelEconomyLabelSubconfigurationReferenceIndicator [Y/N (FE-RL1.7)] was added with cardinality (1,1).
  - o Data element FuelEconomyLabelManufacturerCode [3 characters (FE-RL1.8)] was added with cardinality (1,1).
  - o Data element ModelTypeIndexNumber [1 to 999 (FE-GL1,CA25,RL2)] was added with cardinality (1,1).
  - o Complex data element FuelEconomyLabelSubConfigurationInformationDetails[Type] was added with cardinality (0,1).
  - o Complex data element RoadLoadSubConfigurationInformationDetails[Type] was added with cardinality (0,1).
  - o Complex data element RoadLoadDataDetails[Type] was added with cardinality (1,1).
  - o Complex data element EPAGeneratedRoadLoadDetails [Type] was added with cardinality (0,1).

- The complex data element FuelEconomyLabelSubConfigurationInformationDetails[Type] was added as follows:
  - o Data element BaseLevelIndexNumber [1 to 99 (FE-GL109,CA25.5,RL2.1)] was added with cardinality (1,1).
  - o Data element ConfigurationIndexNumber [1 to 999 (FE-GL117,CA26,RL2.2)] was added with cardinality (1,1).
  - o Data element SubConfigurationIndexNumber [1 to 99 (FE-GL121,CA29.5,RL3)] was added with cardinality (1,1).

- The complex data element RoadLoadSubConfigurationInformationDetailsType[Type] was added as follows:
    - Data element TestGroupName [12 characters, optional . after 5th and before last (FE-IV6,GL13.5,126,CA34,RL4,GL207)] was added with cardinality (1,∞).
    - Data element EngineCodeText [1 to 14 characters (FE-GL119,CA28,RL5,IV30)] was added with cardinality (1,1).
    - Data element AxleRatioValue [0.00 to 9.99 (FE-IV29,GL120,CA29,RL15)] was added with cardinality (1,1).
    - Data element EquivalentTestWeightValue [Enumeration of 48 values (FE-GL123,CA31,RL21,IV31)] was added with cardinality (1,1).
    - Data element TotalRoadLoadHorsepowerValue [0.0 to 99.9 (FE-IT21,GL122,CA30,RL22)] was added with cardinality (1,1).

- The complex data element RoadLoadDataDetails[Type] was added as follows:
    - Data element EquivalentEngineCodeText [1 to 14 characters (FE-RL5.1)] was added with cardinality (1,∞).
    - Data element InUseEngineCodeDescriptionText [1 to 500 characters (FE-RL6)] was added with cardinality (1,1).
    - Data element RimAndTireSizeDescriptionText [1 to 20 characters (FE-RL16)] was added with cardinality (1,1).
    - Data element TireTypeIdentifier [Enumeration of 5 identifiers (FE-RL17)] was added with cardinality (1,1).
    - Data element TireManufacturerName [1 to 25 characters (FE-RL18)] was added with cardinality (1,1).
    - Data element NVRatioValue [0.0 to 999.9 (FE-RL19)] was added with cardinality (1,1).
    - Data element CurbWeightValue [0 to 14000 (FE-RL20)] was added with cardinality (1,1).
    - Data element TargetCoefficientAValue [Lbf, -999.999 to 999.999 (FE-IT25,RL24)] was added with cardinality (1,1).
    - Data element TargetCoefficientBValue [Lbf/mph, -9.99999 to 9.99999 (FE-IT26,RL25)] was added with cardinality (1,1).
    - Data element TargetCoefficientCValue [Lbf/mph**2, -9.999999 to 9.999999 (FE-IT27,RL26)] was added with cardinality (1,1).
    - Data element RoadLoadDeterminationIdentifier [Enumeration of 2 identifiers type definition] was added with cardinality (1,1).

- The complex data element RoadLoadReportDeleteDetails[Type] was added as follows:
    - Data element ReportDeleteProcessCode [Enumeration of 2 codes (FE-IV1,FTRD)] was added with cardinality (1,1).
    - Data element EPAManufacturerCode [3 characters (FE-IV2,IV-DR2,IT2,IT-DR2,GL2,10,125.5,CA0,11.5,25.1,124,FT0.7,RL1)] was added with cardinality (1,1).
    - Data element RoadLoadIndexNumber [1 to 99,999 (FE-RL1.5)] was added with cardinality (1,1).
    - Data element ModelYear [YYYY (FE-IV8,GL3,CA1,FT2,RL1.6,CRR)] was added was added with cardinality (1,1).
    - Data element ModelTypeIndexNumber [1 to 999 (FE-GL1,CA25,RL2)] was added with cardinality (1,1).

- Data element DeletionReportReasonText [1 to 500 characters (FE-IV45,IT39,RL28)] was added with cardinality (0,1).

XML Shared Data Element and Data Type File Modifications

The annotation following the data element name references the corresponding data element identifiers in the DR spreadsheet. Note that some data elements may be used in more locations in the schemas than defined in the DR spreadsheet.

EN_VER_LD_FE_SharedDataElements_v0.9.xsd

The following data elements had their data type or enumerations modified. As such, this modification has an impact to each schema that the associated data element is used in. The annotation following the data element name references the corresponding data element identifiers in the DR spreadsheet. Note that some data elements may be used in more locations in the schemas than defined in the DR spreadsheet.

- Data type Rating1To10Type [Enumeration of 10 ratings type definition] was added with the following enumerations:
  - '1' [Worst]
  - '2'
  - '3'
  - '4'
  - '5'
  - '6'
  - '7'
  - '8'
  - '9'
  - '10' [Best]
- Data type for SubConfigurationFinalModelYearGreenhouseGasProductionNumber [rpm, 0 to 999,999 (FE-CA193)] was changed to Integer6DigitNonNegativeType.
- Data type for SubConfigurationFinalModelYearProductionNumber [rpm, 0 to 999,999 (FE-CA32)] was changed to Integer6DigitNonNegativeType.
- Enumerations for TransmissionTypeIdentifierType [Enumeration of 8 identifiers type definition] were changed as follows:
  - 'AMS' [Automated manual – selectable (e.g., Automated manual with paddles)] was added.
- Enumerations for TestResultIdentifierType [Enumeration of 37 identifiers type definition] were changed as follows:
  - 'CO2 BAG 1' [Bag 1 Carbon Dioxide] was added.
  - 'CO2 BAG 2' [Bag 2 Carbon Dioxide] was added.
  - 'CO2 BAG 3' [Bag 3 Carbon Dioxide] was added.
  - 'CO2 BAG 4' [Bag 4 Carbon Dioxide] was added.

EN_VER_LD_ SharedDataElements_v0.9.xsd

The following data elements had their data type or enumerations modified. As such, this modification has an impact to each schema that the associated data element is used in. The annotation following the data element

name references the corresponding data element identifiers in the DR spreadsheet. Note that some data elements may be used in more locations in the schemas than defined in the DR spreadsheet.

- Enumeration annotations for VehicleClassIdentifierType [Enumeration of 11 identifiers type definition] were changed as follows:
    - o 'HDV1' [Federal HD chassis GVW 8501-10000] was changed to 'HDV1' [Federal HD chassis Class 2b GVW 8501-10000].
    - o 'HDV2' [Federal HD chassis GVW 10001-14000] was changed to 'HDV2' [Federal HD chassis Class 3 GVW 10001-14000].
- Enumerations for LightDutyTransmissionTypeIdentifierType [Enumeration of 8 identifiers type definition] were changed as follows:
    - o 'AMS' [Automated manual – selectable (e.g., Automated manual with paddles)] was added.
- Enumerations for TestResultIdentifierType [Enumeration of 37 identifiers type definition] were changed as follows:
    - o 'CO2 BAG 1' [Bag 1 Carbon Dioxide] was added.
    - o 'CO2 BAG 2' [Bag 2 Carbon Dioxide] was added.
    - o 'CO2 BAG 3' [Bag 3 Carbon Dioxide] was added.
    - o 'CO2 BAG 4' [Bag 4 Carbon Dioxide] was added.