Emissions Modeling Framework (EMF) Uses for SIP Inventory Development

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2023 MARAMA SIP Development Workshop

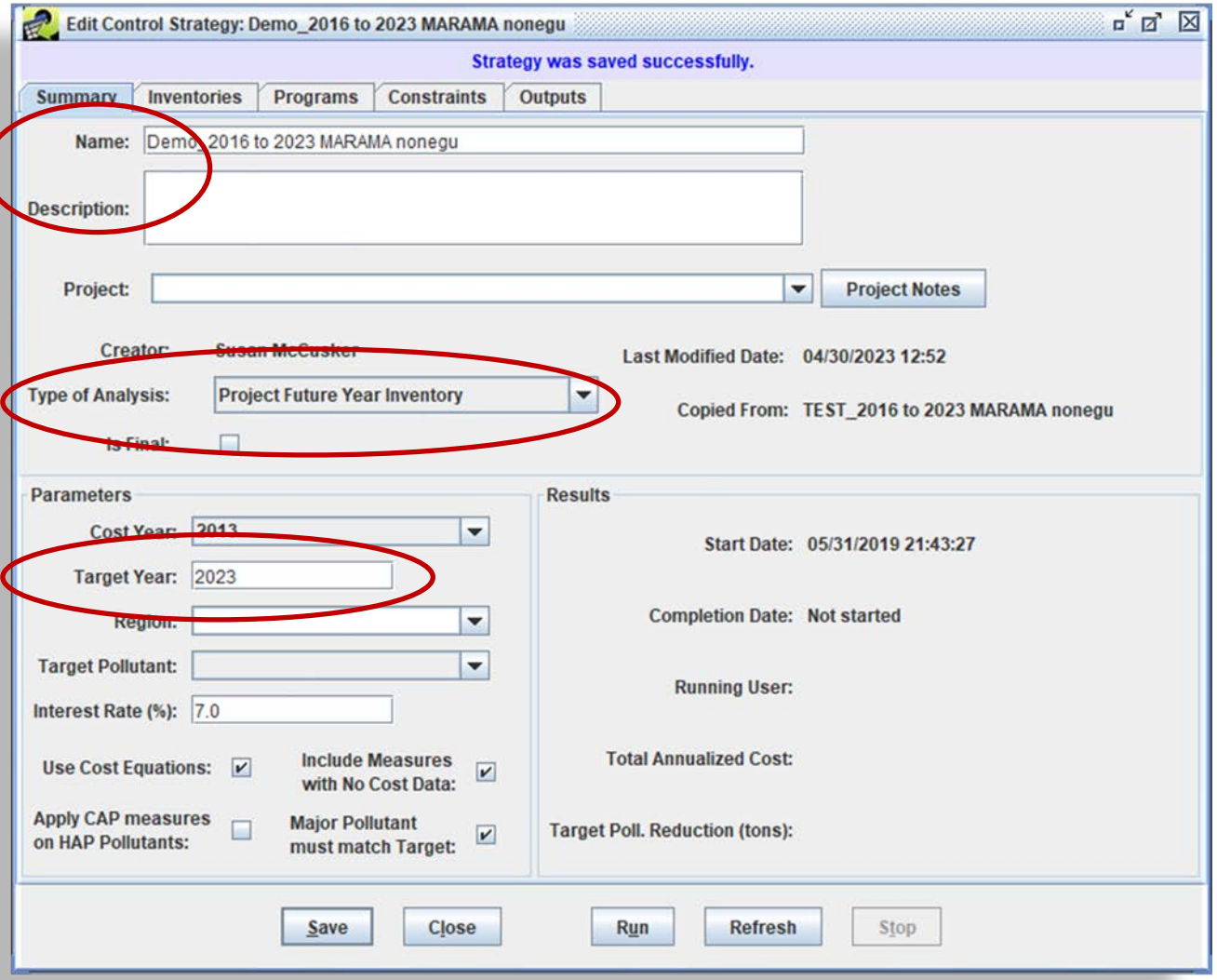
MARAMA
Mid Atlantic Regional Air Management Association, Inc.

EMF/CoST for SIPs – Emission Inventories in SIPs

- EPA, MARAMA use the EMF to manage regional inventories and project future emission inventories
- Types of emissions inventories in SIPs
  - Attainment demo modeling – actual annual (base) & future projection
  - Reasonable Further Progress (RFP) – actual annual & future projection; control measure demonstration
  - Redesignation requests – attainment, interim, and future projection year emissions at least 10 yrs out. Annual and/or seasonal based on pollutant

EMF/CoST for SIPs – Create Future Year Inventory

- Name
- Description
- Type of Analysis: Project Future Year Inventory
- Target Year
  - Used to build cutoff dates for applying closures, controls
  - Can be base year to create a controlled inventory



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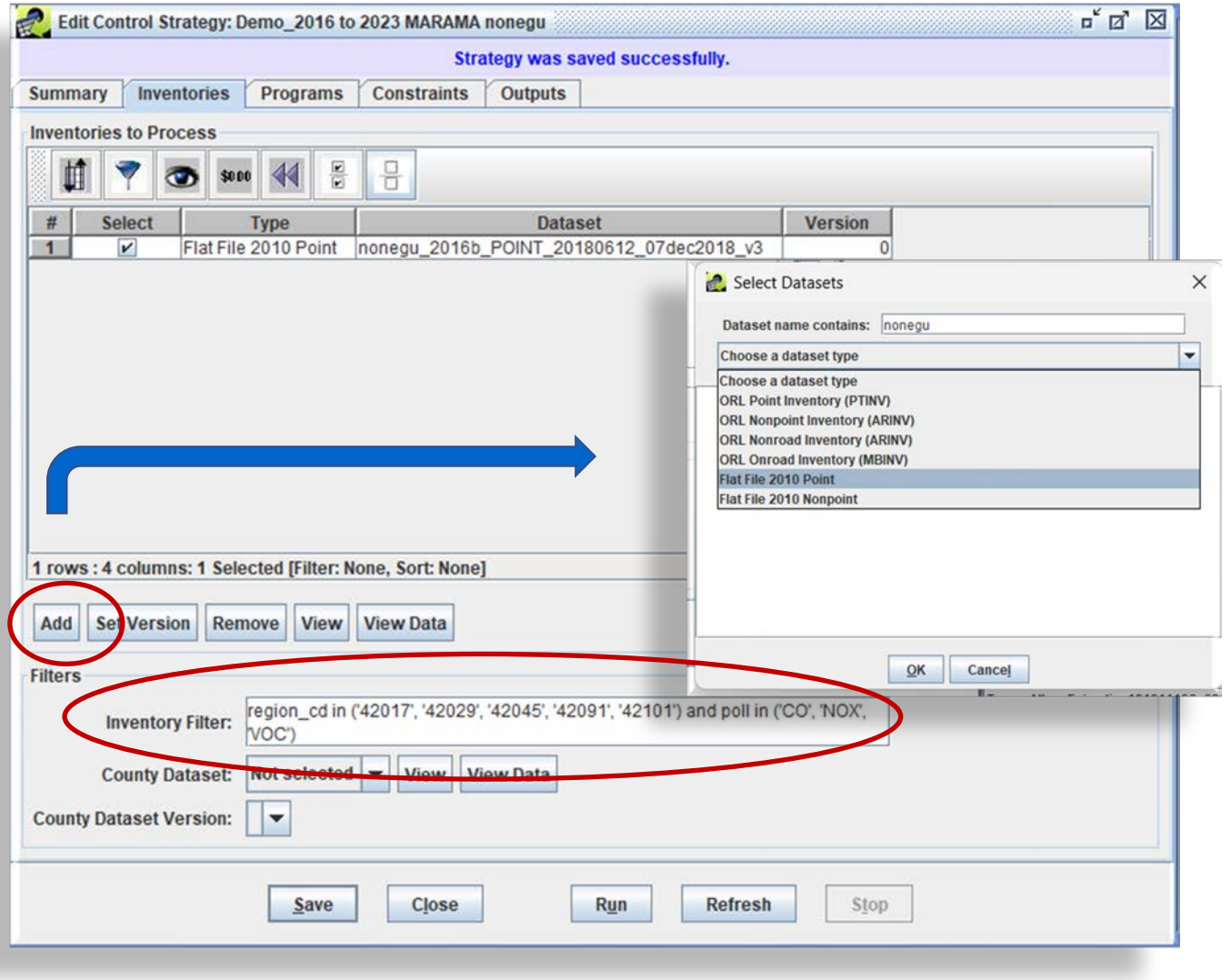
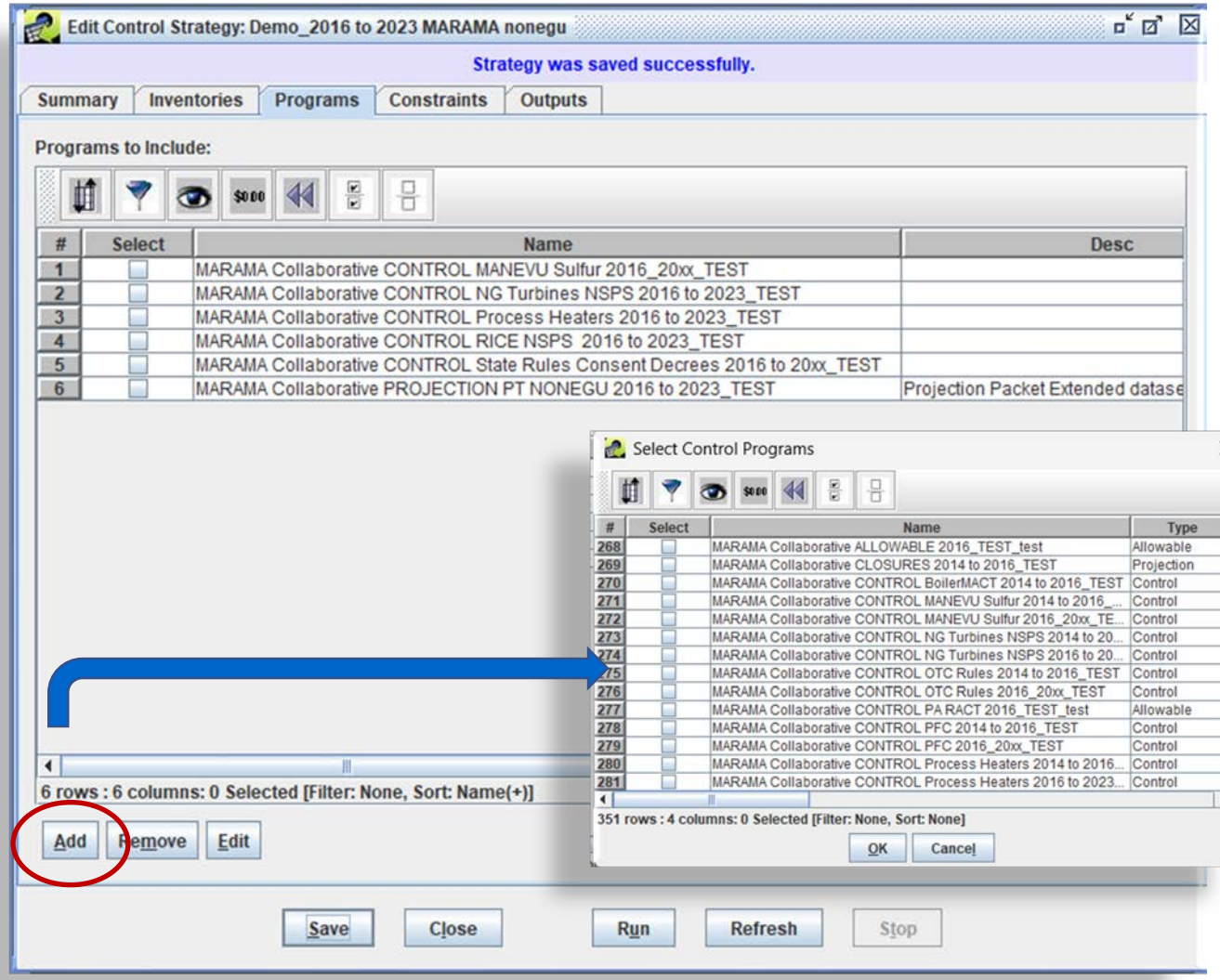
EMF/CoST for SIPs – Create Future Year Inventory

- Add inventories
  - From datasets in the EMF
- Inventory Filter
  - SQL filter for e.g., states, counties, pollutants, etc.



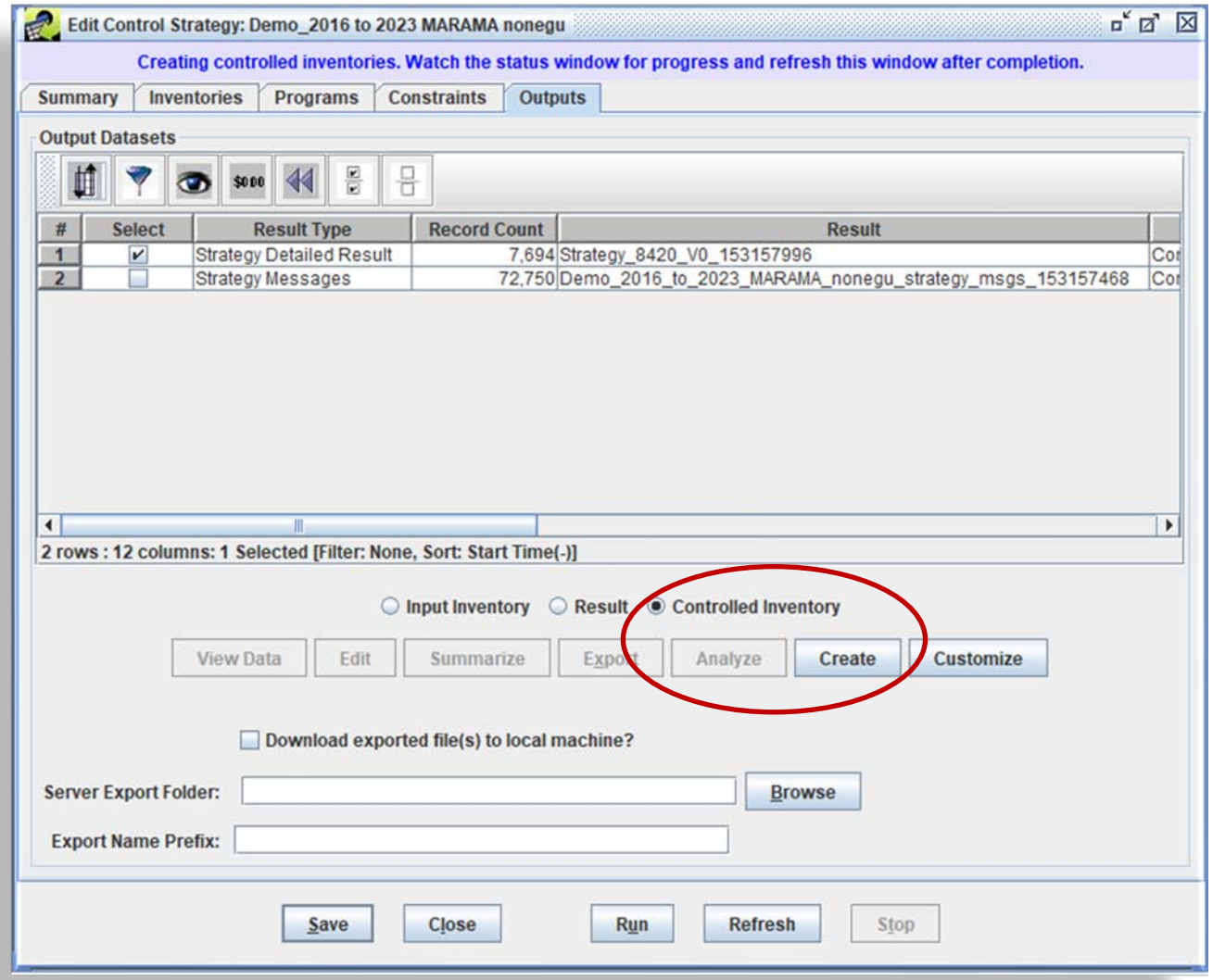
EMF/CoST for SIPs – Create Future Year Inventory

- Add Control Programs
  - *Apply factors developed outside of EMF/CoST*
    - Closures
    - Control factors
    - Growth factors



EMF/CoST for SIPs – Create Future Year Inventory

- Strategy Messages to check results
  - *e.g.*, control doesn't affect any sources; duplicate controls
- Strategy Detailed Result (SDR)
  - Initial & final emissions, adj_factor for each source
- Combine SDR and input inventory to Create a Controlled Inventory



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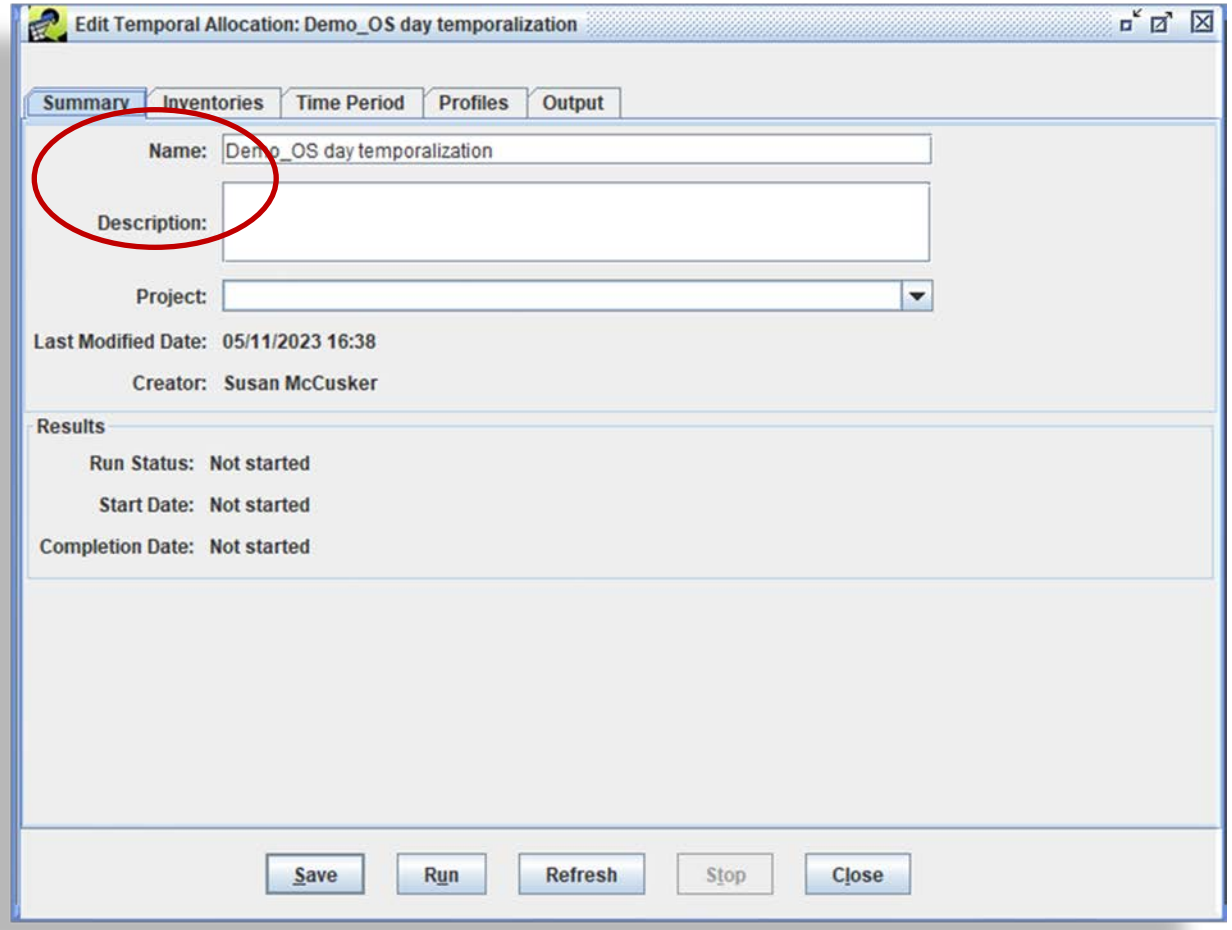
EMF/CoST for SIPs – Create Future Year Inventory

- Same format as input inventory
- Projected inventory file header information
  - New dataset's description contains comments about the PFYI strategy
  - Controlled sources: ANN_PCT_RED, CEFF, PROJECTION_FACTOR

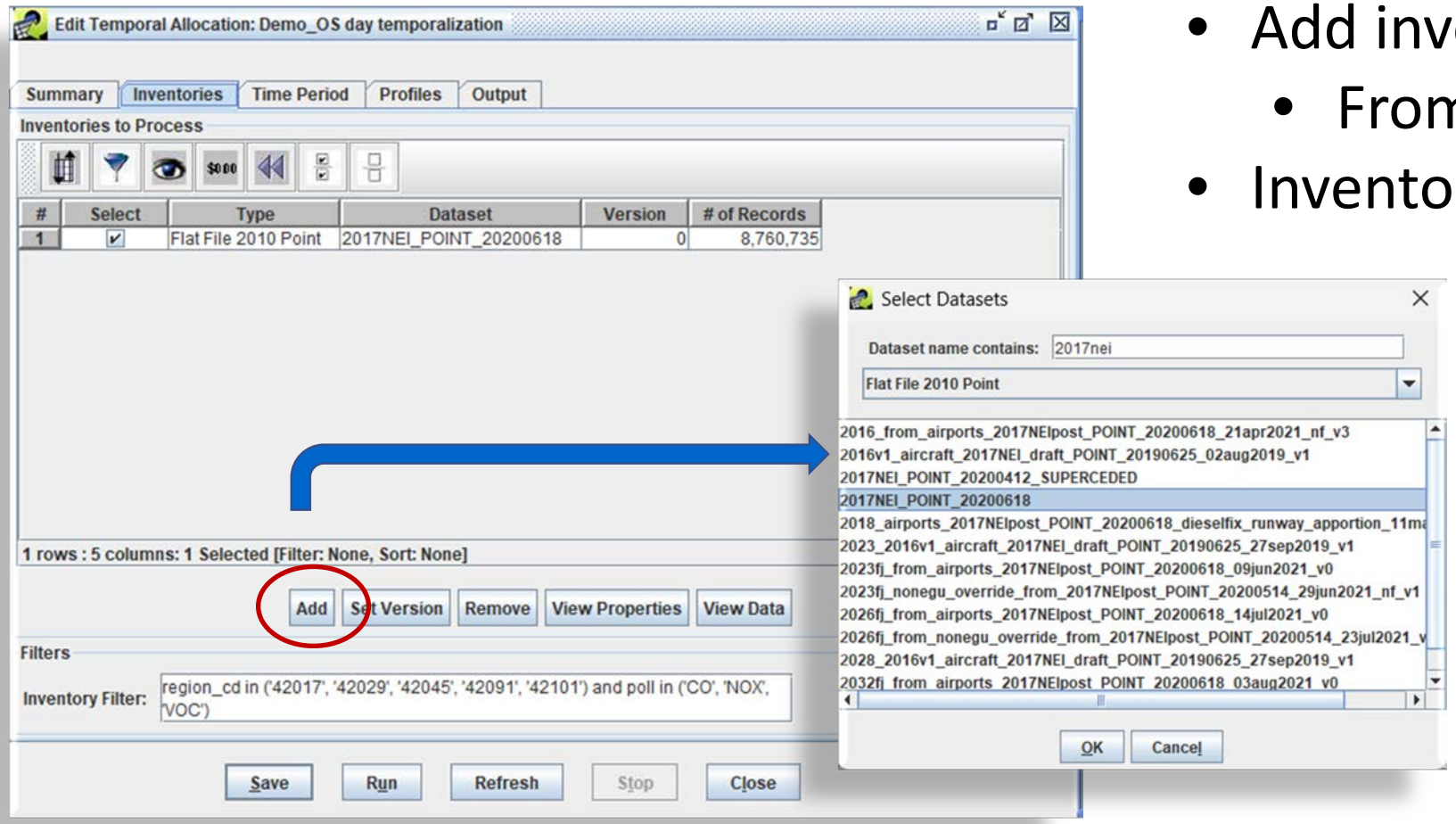
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
26	#STRATEGY_NAME=Demo_2016 to 2023 MARAMA nonegu														
27	#STRATEGY_TYPE=Project Future Year Inventory														
35	#CONTROL_PROGRAM="MARAMA Collaborative CONTROL MANEVU Sulfur 2016_20xx_TEST; Control; MARAMA_CONTROL_MANEVU_Sulfur_Rules_2016_20xx_24may2019.csv"														
36	#CONTROL_PROGRAM="MARAMA Collaborative CONTROL State Rules Consent Decrees 2016 to 20xx_TEST; Control; MARAMA_CONTROL_State_Rules_CDx_2016_20xx_31may2019.csv"														
37	#CONTROL_PROGRAM="MARAMA Collaborative PROJECTION PT NONEGU 2016 to 2023_TEST; Projection; MARAMA_GROWTH_POINT_nonegu_2016_2023_31may2019.csv"														
38	#CONTROL_PROGRAM="MARAMA Collaborative CONTROL NG Turbines NSPS 2016 to 2023_TEST; Control; MARAMA_CONTROL_NG_Turbines_NSPS_2016_2023_31may2019.csv"														
39	#CONTROL_PROGRAM="MARAMA Collaborative CONTROL Process Heaters 2016 to 2023_TEST; Control; MARAMA_CONTROL_Process_Htrs_NSPS_2016_2023_31May2019.csv"														
40	#CONTROL_PROGRAM="MARAMA Collaborative CONTROL RICE NSPS 2016 to 2023_TEST; Control; MARAMA_CONTROL_RICE_NSPS_2016_2023_31may2019.csv"														
41	#EXPORT_DATE=Thu May 11 15:46:10 UTC 2023														
42	#EXPORT_VERSION_NAME=Initial Version														
43	#EXPORT_VERSION_NUMBER=0														
44	country_cd	region_cd	tribal_code	facility_id	unit_id	rel_point_id	process_id	agy_facility_id	agy_unit_id	agy_rel_point_id	agy_process_id	scc	poll	ann_value	ann_pct_red	fac

EMF/CoST for SIPs – Temporalization



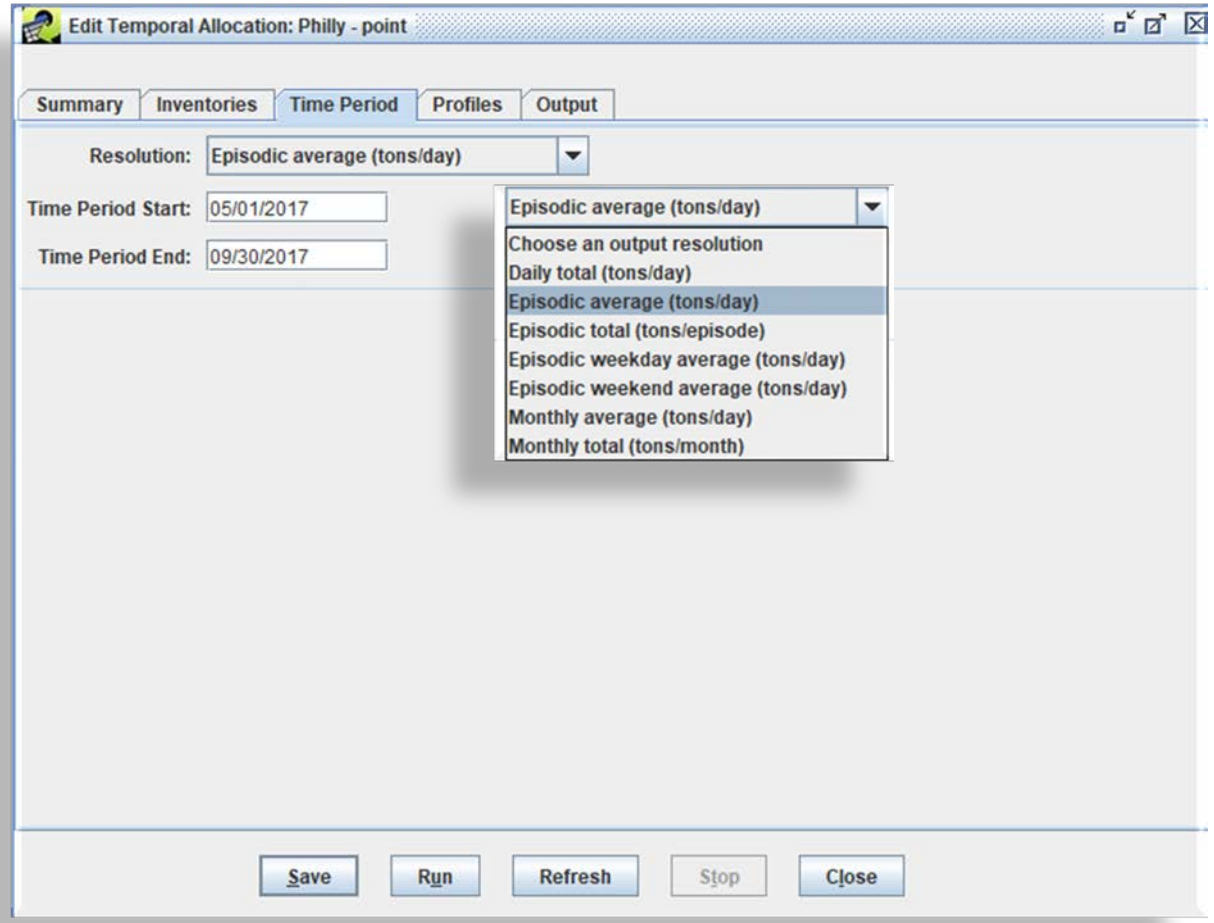
- Name
- Description

EMF/CoST for SIPs – Temporalization



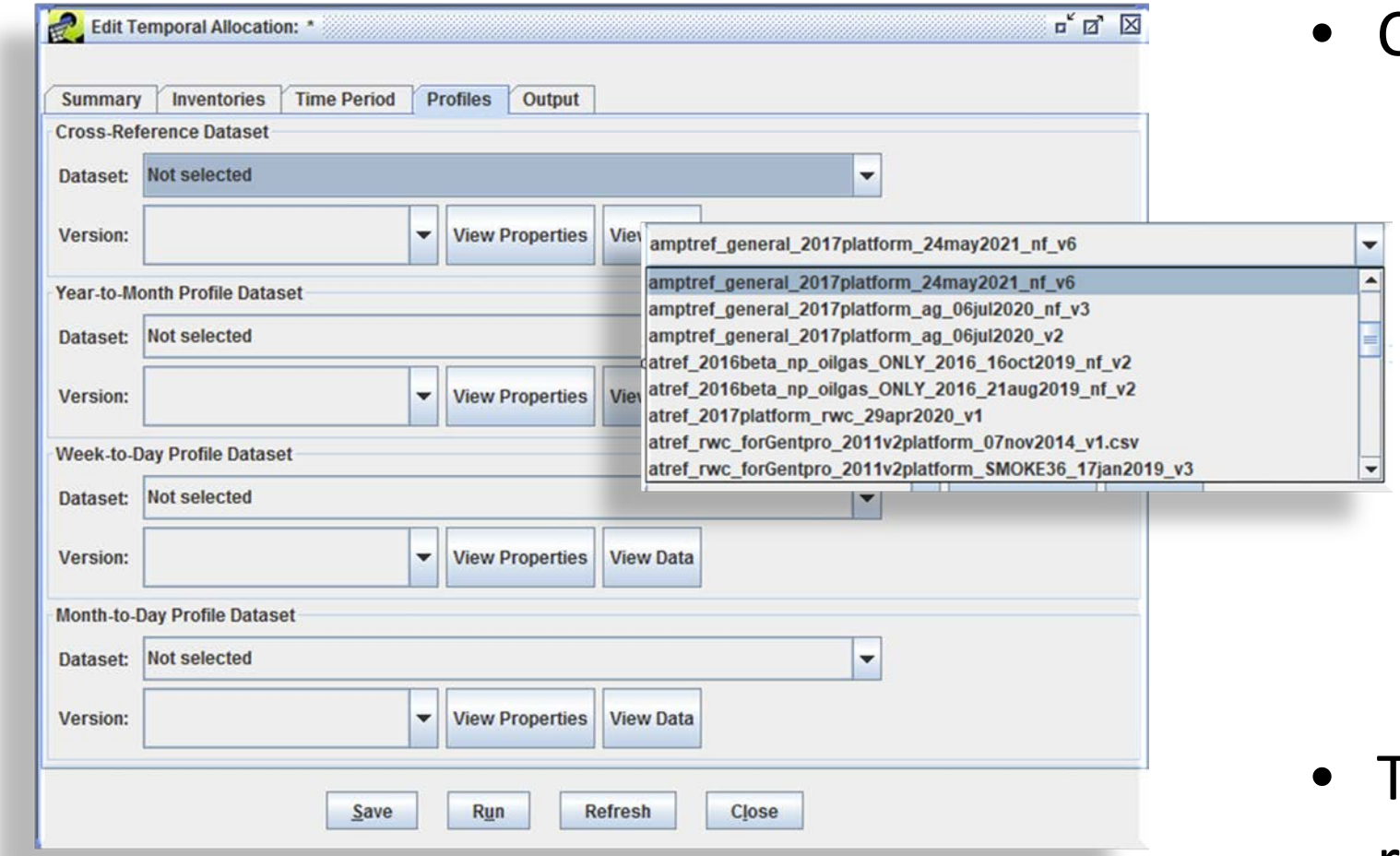
- Add inventories
  - From datasets in the EMF
- Inventory Filter

EMF/CoST for SIPs – Temporalization



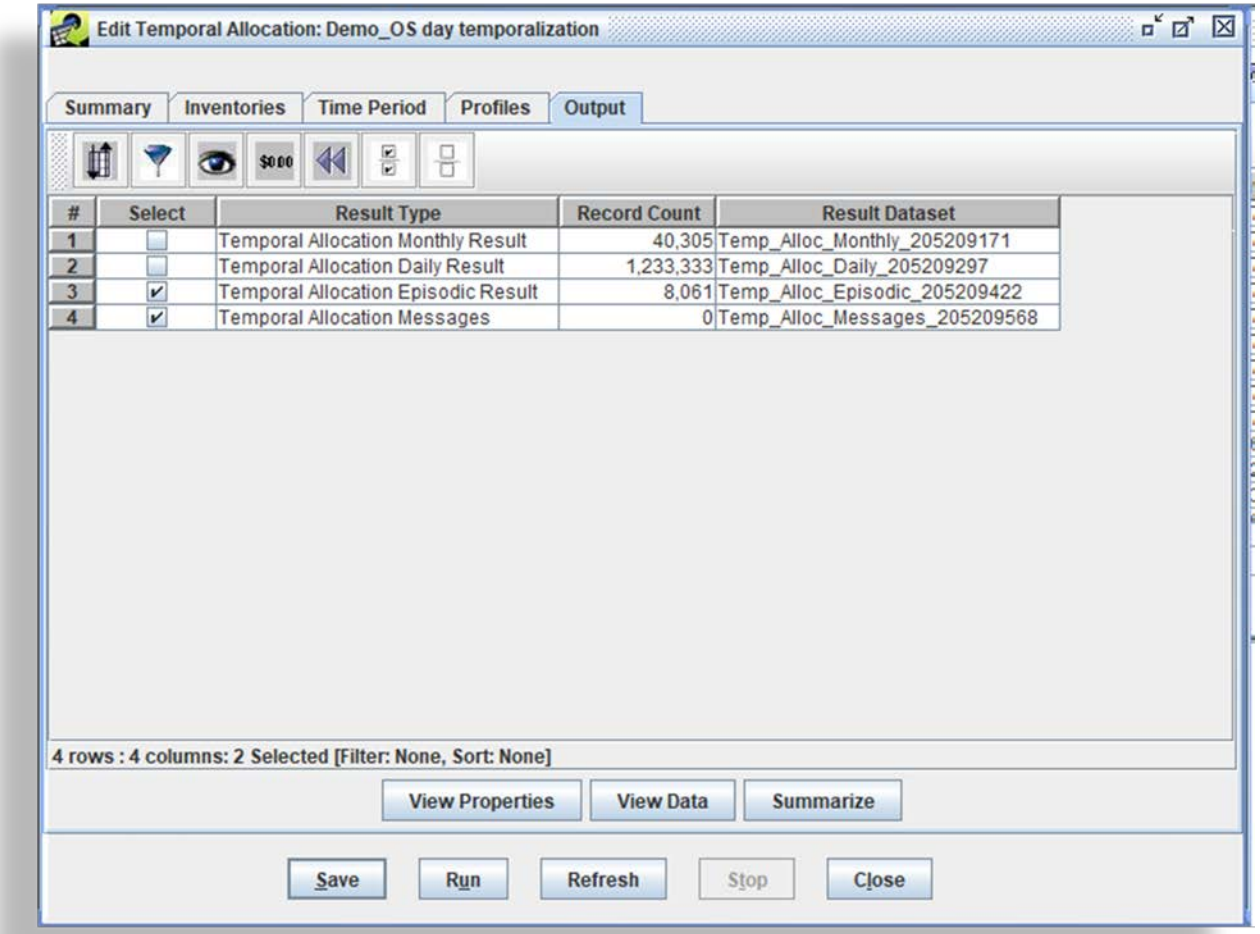
- Choose your Resolution
- Choose your Time Period Start and End dates
  - *e.g.*, ozone season average tons/day

EMF/CoST for SIPs – Temporalization



- Choose your Temporal Profiles
  - Cross-Reference Dataset assigns temporal allocation profiles to each source in the inventory
  - Profile datasets contain factors to estimate emissions for different temporal resolutions
- The pull-down menus have only relevant datasets

EMF/CoST for SIPs – Temporalization



- Temporal Allocation Messages
  - 0 if all sources have profiles
- Episodic Result
  - At resolution selected on Time Period tab
- Monthly & Daily Result are interim steps in the Episodic Result
  - Monthly - total & average day
  - Daily - day

EMF/CoST for SIPs – Temporalization

- Temporalization Episodic Result output file exported as CSV
- total_emis = for the episode, not annual

	A	B	C	D	E	F	G	H	I	J
1	#Temporal allocation details									
2	#Temporal allocation name: Demo_OS day temporalization									
3	#Input inventories: 2017NEI_POINT_20200618									
4	#Inventory filt	'42029'	'42045'	'42091'	'42101') an	'NOX'	'VOC')			
5	#Resolution: Episodic average (tons/day)									
6	#Time period:	2017 thro	2017							
7	#Cross-reference dataset: amptref_general_2017platform_24may2021_nf_v6									
8	#Year-to-month profile dataset: amptpro_general_2011platform_tpro_monthly_6nov2014_30nov2018_nf_v9									
9	#Week-to-day profile dataset: amptpro_general_2011platform_tpro_weekly_6nov2014_09sep2016_v2									
10	#EXPORT_DATE=Thurs May 11 13:40:09 UTC 2023									
11	#EXPORT_VERSION_NAME=Initial Version									
12	#EXPORT_VERSION_NUMBER=0									
13	scc	fips	plantid	pointid	stackid	processid	poll	total_emis	days_in_episode	avg_day_emis
14	10100101	42045	6595211	17836013	17335912	93038214	NOX	44.920278	153	0.293597
15	10100101	42045	6595211	17836013	17335912	93038214	CO	21.256018	153	0.138928
16	10100101	42045	6595211	17836013	17335912	93038214	VOC	1.7708452	153	0.011574
	100401	42101	6531411	103862913	107522912	146958914	NOX	0.0003363	153	2.20E-06

EMF/CoST for SIPs – Summary

- EMF manages emissions inventories & related inputs, documents steps
- EPA, MARAMA use the EMF to develop future projection inventories
- MARAMA uses the EMF to temporalize annual inventories (base and future)
- Documentation/EMF User's Guide - https://www.cmascenter.org/cost/