ATLANTIC ENERGY ASSOCIATES LLC

New Emission Reduction Policy in Indonesia

Emission Estimates using the iPOG

Virtual Workshop Presentation 23-25 March 2021

24 March 2021

Wojciech Jozewicz

ATLANTIC ENERGY ASSOCIATES LLC

Outline

- Summary of 2017 UNEP-MOEF study
- Evolution of current DOS study from 2017 study
- Objectives of Phase 1 DOS study
- Role of stakeholders in future reporting to Minamata Convention Objectives
- Inventory database analysis with iPOG
- Phase 2 project selection criteria
- iPOG modeling of selected units
- DOS study Phase 2 recommendations

UNEP-MOEF Study from 2017

- Small Scale Funding Agreement: UNEP-BCRC-MOEF
- Technical team included MOEMR and local specialists
- Work performed under auspices of UNEP Global Mercury Partnership
- The most recent comprehensive analysis of coal-fired power sector

Scope of 2017 Study

- Presented current relevant information to improve accuracy of future emission inventories
  - Overview of coal sector
  - Characterization of power sector
- Selected SSFA study results
  - Analyses of coal samples for 47 PLTUs
  - Hg emission measurements at 3 PLTUs, including speciation
  - Hg concentration in bottom and fly ash
  - Emission inventory for coal fired energy sector

2017 Study Recommendations

- Improvement of Hg mass balance at PLTUs sampled in 2017
- Consideration for application of Method 30B for monitoring requirements
- Detailed sector analysis leading to cost-efficient solutions in compliance with the NIP
- Extensive stakeholder activities

ATLANTIC ENERGY ASSOCIATES LLC

Stakeholders Activities

- Activities designed for different groups, e.g., general public, sectoral workers, government officials
- Awareness workshops for stakeholders such as NGOs, media, workers, local/central government
- Elucidation of CEMs usage and policy; should include monitoring of mercury emissions
- Implementation of air quality monitoring policy reviews (CEMs results) to inform the public and to carry out law enforcement activities
- Integration of application of CEMs across the sector
- Future data needs should be well-defined and informational exchanges should be initiated with units of interest for future implementation of emission reduction

ATLANTIC ENERGY ASSOCIATES LLC

Objectives of DOS Project - Phase 1

- Utilize iPOG to update 2017 estimates of mercury emissions from selected coal-fired units in Indonesia
- Select three coal-fired electricity generating units for more detailed study in Phase 2
- Work closely with the Ministry and BCRC to prepare cases for improvement to be presented to stakeholders during phases that will follow
- Define data needs, initiate informational exchanges, and use iPOG to model units of interest for future mercury reduction strategies

ATLANTIC ENERGY ASSOCIATES LLC

Data Used for DOS Study

- Baseline: BCRC database from 2017

  "Final Report Mercury Emissions from Coal-Fired Power Plants in Indonesia," UN Environment/Basel Convention Regional Centre for South-East Asia 2017

- Augmented with September 2020 data from BCRC
- Input from "World Electric Power Plants Database," S&P Global Market Intelligence June 2020
- Data to be refined in phases to follow with guidance from BCRC and MOEF

ATLANTIC ENERGY ASSOCIATES LLC

DOS Project Development Rationale

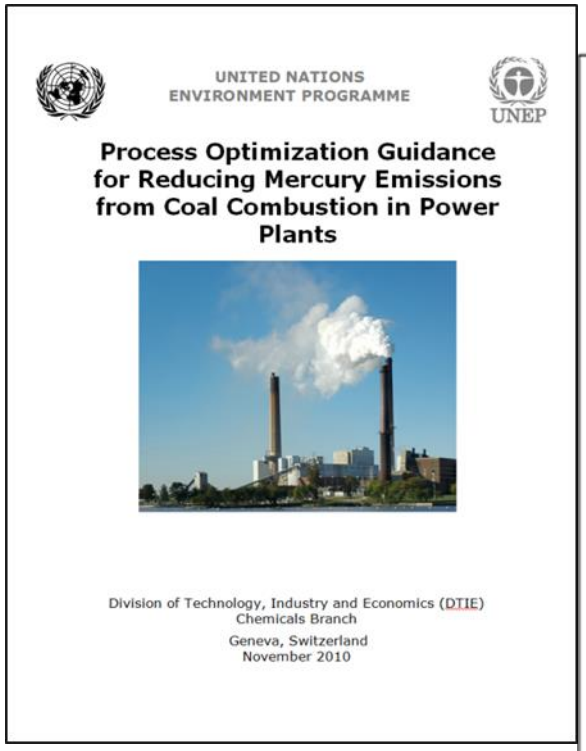
- Utilization of UNEP tools, such as iPOG, when possible
- Compliance with BAT/BEP approach
- Obtaining approval from the Ministry and BCRC as to sites and technologies selected
- Full compliance with broader country-wide NIP for Minamata Convention

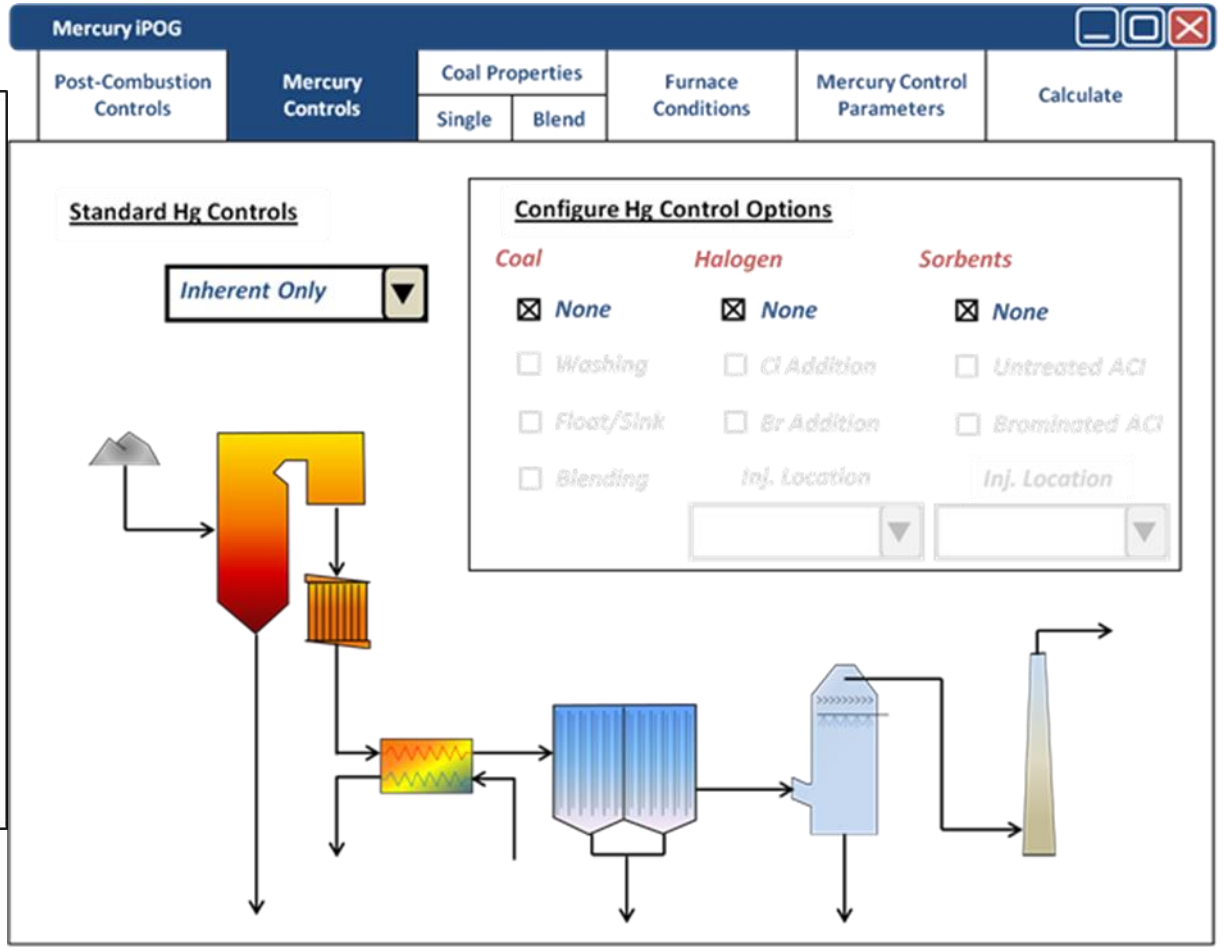
ATLANTIC ENERGY ASSOCIATES LLC

Database Processing

- Units considered in groups for project selection purpose
  - large units without FGD
  - large units with FGD
  - <100 MW units
- Focus on units >100 MW
- Units <100 MW not typical for power sector but may be heavily polluting locally
- Significant Hg co-benefit capture optimization may be limited to plants with FGD
- Improved analysis of the entire fleet of plants utilizing UNEP tools

UNEP Tools


UNITED NATIONS ENVIRONMENT PROGRAMME
UNEP
Process Optimization Guidance for Reducing Mercury Emissions from Coal Combustion in Power Plants
Division of Technology, Industry and Economics (DTIE)
Chemicals Branch
Geneva, Switzerland
November 2010

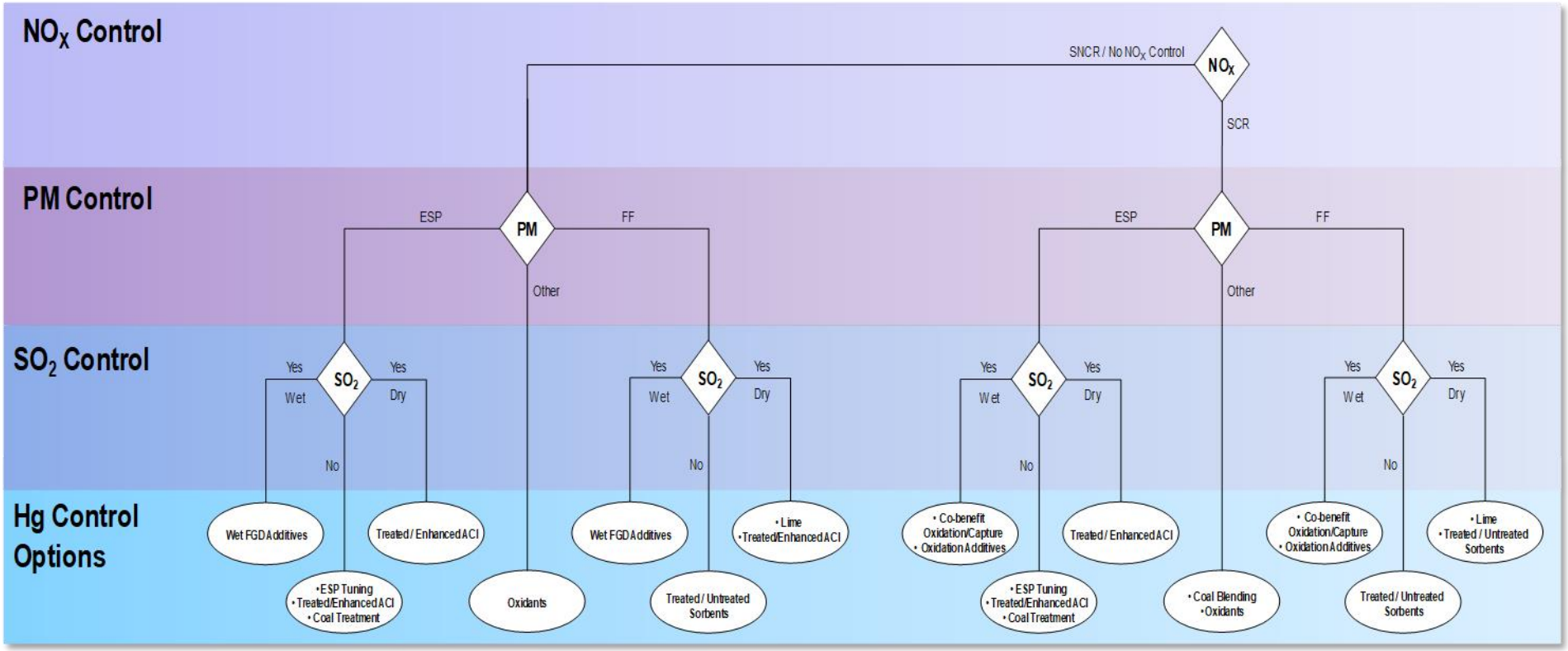

Mercury iPOG
Post-Combustion Controls
Mercury Controls
Coal Properties
Single
Blend
Furnace Conditions
Mercury Control Parameters
Calculate
Standard Hg Controls
Inherent Only
Configure Hg Control Options
Coal
Halogen
Sorbents
None
None
None
Washing
Cl Addition
Untreated ACI
Float/Sink
Br Addition
Brominated ACI
Blending
Inj. Location
Inj. Location

POG/iPOG Approach

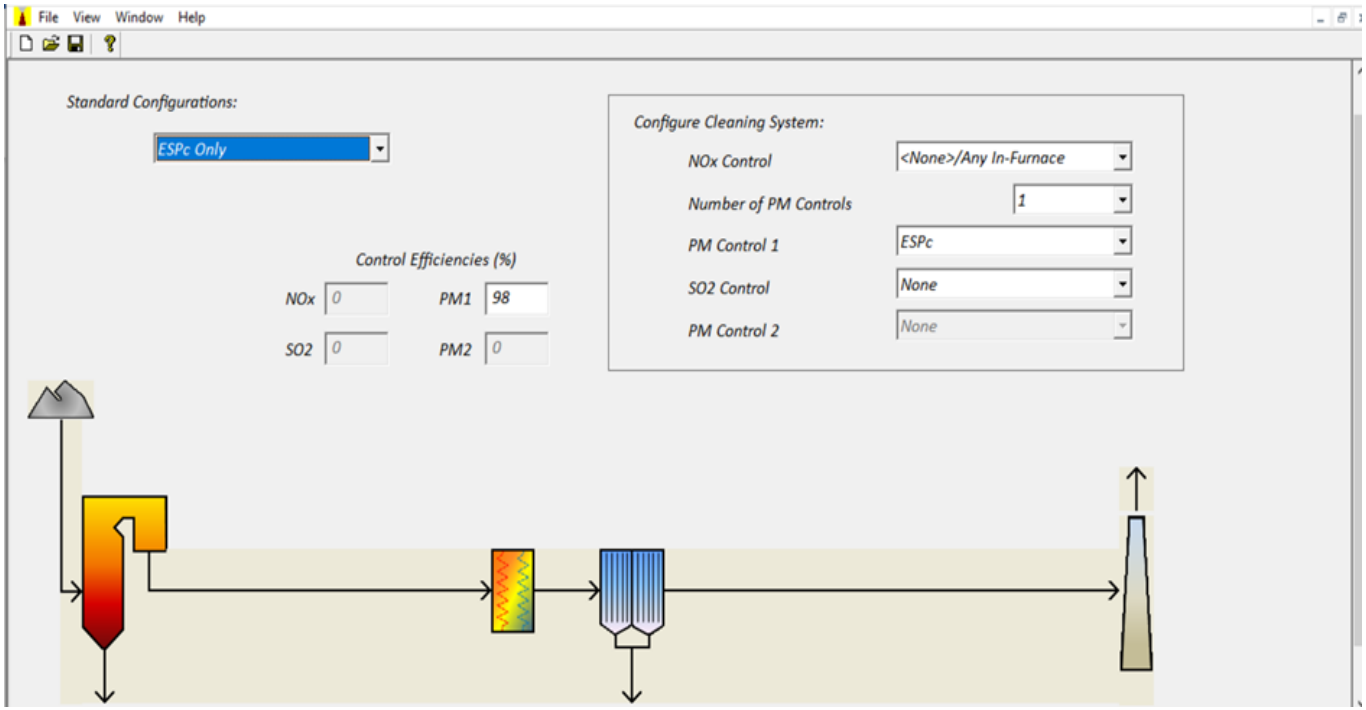
- Promotes options that improve the overall minimization of emissions from the plant
- Promotes options that maximize the reduction of several pollutants simultaneously
- Emphasizes co-benefit approaches
- Has been used as a platform for UNEP BAT/BEP development
- iPOG has been coded according to POG

ATLANTIC ENERGY ASSOCIATES LLC

iPOG Flow



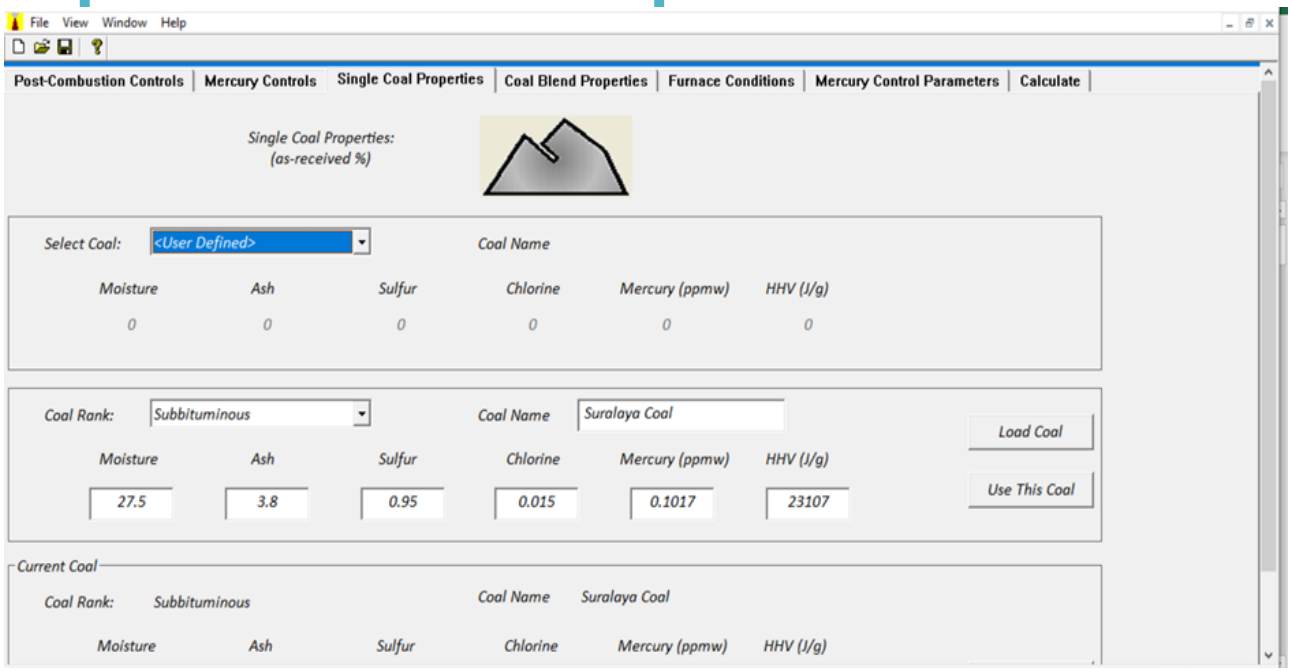
Example of iPOG Input - Configuration



- Example configuration: ESP only, no SO_2 control, no post-combustion NOx control systems

ATLANTIC ENERGY ASSOCIATES LLC

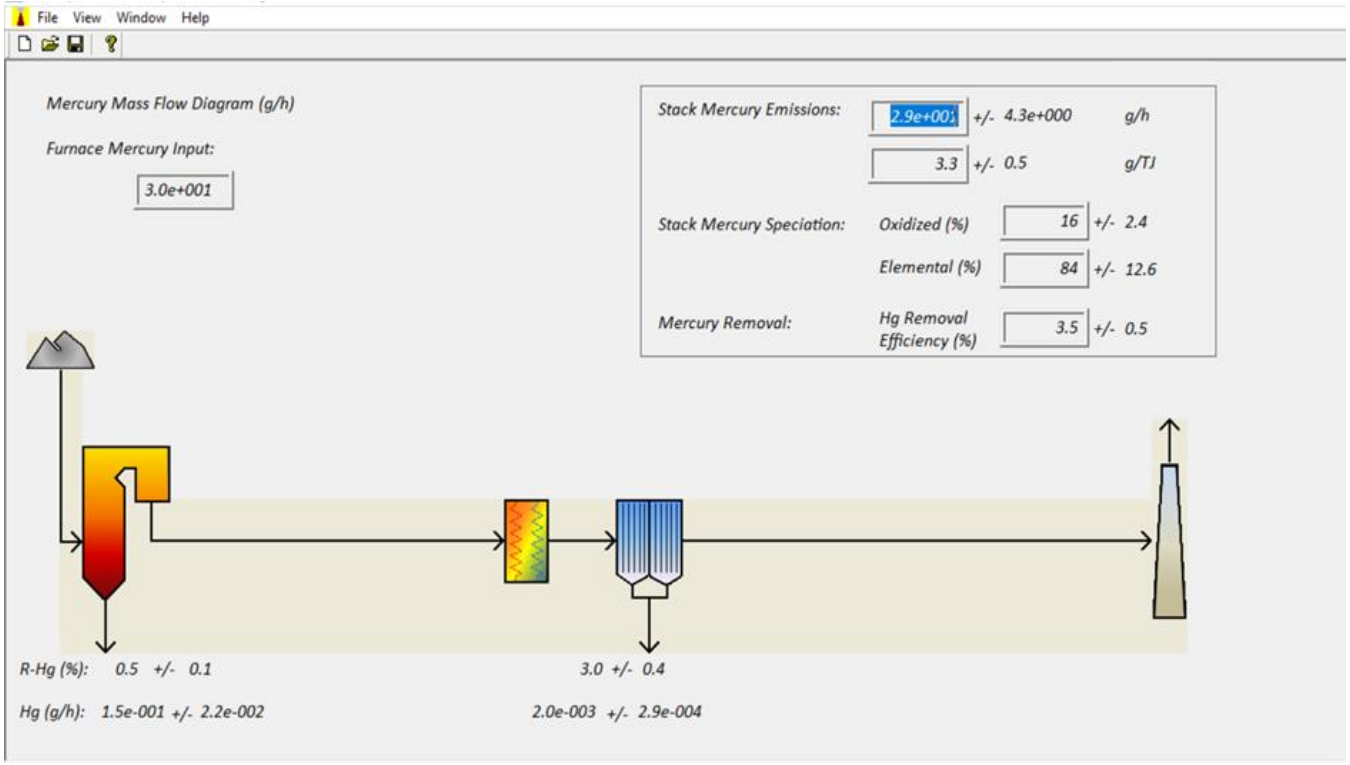
Example of iPOG Input - Coal



- Higher heating value (HHV) of coal is used
- Coal blends may be used and may be user-defined
- Data should be entered for coal S and Cl content; these elements can significantly affect Hg behavior
- Data should be entered for Hg content in coal; affects Hg release from plant

ATLANTIC ENERGY ASSOCIATES LLC

Example of iPOG Calculations - Results



- Based on input parameters, iPOG estimates stack emissions of Hg
- Estimates of elemental and oxidized stack emissions
- Estimates of Hg outflows from furnace (bottom ash) and ESP (flyash)

Scope of iPOG Analysis

What these considerations are meant to be

- Qualitative ranking of emission for units where enough data is available to do so
- Selection methodology for reduction of Hg emissions
- Initial platform for discussions with stakeholders

What these considerations are not meant to be

- An attempt to build Hg or SO_2 emission inventory
- Quantitative prediction of emissions
- Policy tool for NIP implementation
- Regional compliance tool

Summary

- Mercury emissions from coal-fired units in Indonesia were estimated with iPOG using augmented data from 2017 study
- Emissions from individual units were analyzed for three groups: large units w/o FGD, large units with FGD,and <100 MW units
- The iPOG tool is available as a free download from the UNEP website

Terima kasih atas perhatian Anda
Thank you for your attention