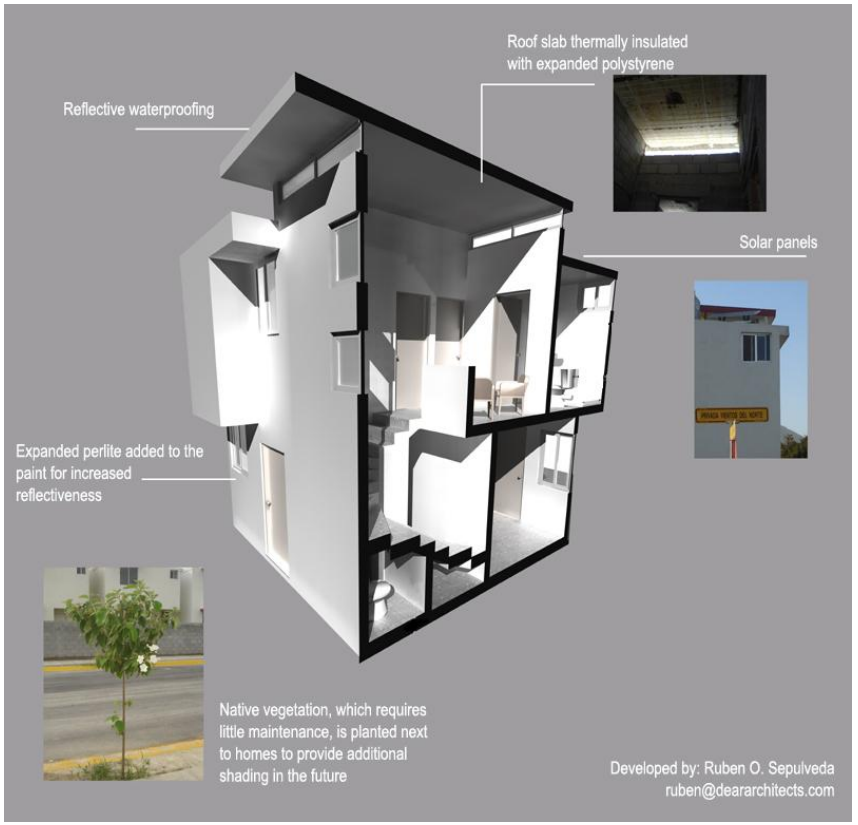
Annotation Agenda #28

AMS-III.AE Energy efficiency and renewable energy measures in new housing

AMS-III.AE Energy efficiency and renewable energy measures in new housing

- Measures include:
  - Efficiency building design practices (e.g. passive solar design, thermal insulation)
  - efficiency technologies (e.g. efficient appliances, high efficiency heating and cooling systems)
  - solar energy technologies (e.g. solar photovoltaic systems)
- Methodology applicable only for savings in grid electricity consumption in project residences as compared to baseline residences



AMS-III.AE Energy efficiency and renewable energy measures in new housing

- Baseline residences are:
  - built and occupied within the prior five years from the start of the project activity
  - are within approx 100 kilometers of the project residences
  - as compared to project residences, have a similar size in terms of floor area (+/-50%)
  - are located in a similar micro-climate (e.g., similar average rainfall, wind, and temperature)
  - are occupied by residents of a similar socio-economic class
  - built in compliance with all applicable energy standards (e.g., building codes) when they both exist and are enforced

AMS-III.AE Energy efficiency and renewable energy measures in new housing

- **Electricity savings** estimated **each year** using one of the following options chosen ex ante:
  - **Option 1**: Ex post comparison of **measured electricity consumption of a sample of project residences** with an estimate of the average **electricity consumption of baseline residences using a calibrated computer simulation** model of the baseline residences, taking into account **actual weather conditions**
  - **Option 2**: Ex post comparison of **measured average electricity consumption of a sample of project residences** with a **sample of baseline residences (comparison group) using regression analyses.**
- **Renewable Energy** (e.g. from rooftop solar **photovoltaic electricity** systems) **delivered to the grid** (not to the project residences) **added to the annual electricity savings** from project residences.

AMS-III.AE Energy efficiency and renewable energy measures in new housing

Option 1 Calibrated computer simulation

- Energy savings of project residences as per Option D of **International Performance Measurement and Verification Protocol (IPMVP),** Concepts and Practices for Determining Energy Savings in New Construction**;**
- Monthly electricity data from **a sample of project residences** throughout the CP(sampling to **90/10 precision, minimum sample is 100** residences)
- Calibrated computer simulation as per **ASHRAE Guideline 14-2002, Measurement of Energy and Demand Savings, Whole Building Calibrated Simulation Performance Path**;
- **Calibration of the of model:** monthly electricity data from a **sample of baseline residences (sampling to 90/10 precision, minimum sample is 100** residences). Information on **building and occupant characteristics, and monthly weather data** collected to define "average" conditions for model calibration. The model **calibrated for year one** and **every third year** thereafter (e.g., year 4, 7, 10), energy use, weather data, and residence characteristics data from the same year as the calibration year

AMS-III.AE Energy efficiency and renewable energy measures in new housing

Option 2 Regression Analysis

- Sample measurements are done in both the project and baseline residences (sampling to 90/10 precision, minimum sample is 100 residences) every year of the crediting period.
- Average **daily energy consumption** (determined from monthly electricity consumption billing data) is the **dependent variable** and at least (a) **weather, (b) a value for non-variable base load electricity consumption**, and (c) an indicator of participation (EE=1 if project and 0 otherwise) as the **primary independent variables**. Other variables should be included (based on survey info or other information) for both baseline and project residences and reported in the PDD.

AMS-III.AE Energy efficiency and renewable energy measures in new housing

Passive solar design

- Orientation of residence in relation to solar radiation
- Type of roof (slanted to one side, slanted on both etc)
- Window specifications (location on frontage and size, opening mechanisms, Protection such as curtains, nets, shutters)
- Protrusions and depressions on frontages, Interior patios, Porch, balconies and vestibule design, skylights and mullions
- Ventilation (unilateral, Crossed)
- Others (thermal chimneys, thermo-syphon ventilation)

Materials and finishing

- Ceilings, walls (e.g. thermal insulation, reflective waterproofing, materials which absorb less heat, color and texture of finishes)

Efficient appliance

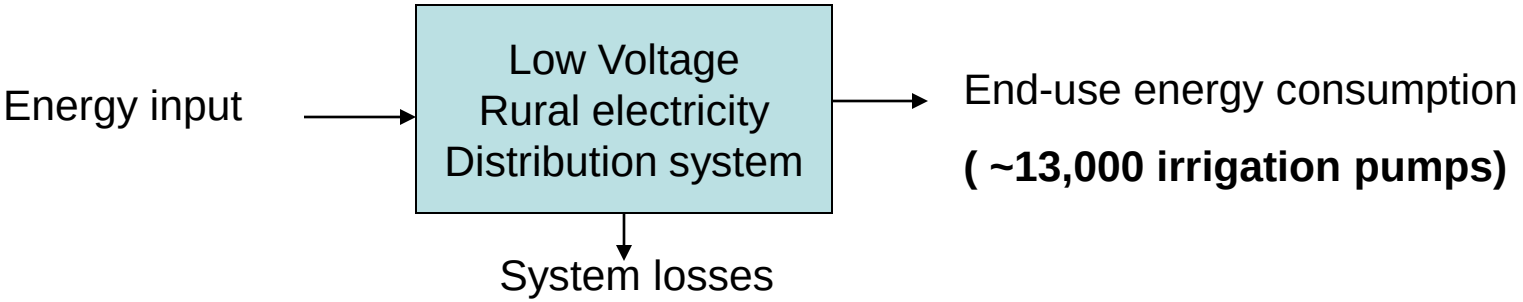
- Efficient lighting (CFL, LED, Air Conditioning Units, Washing machines, Refrigerators)

Annotation Agenda #29

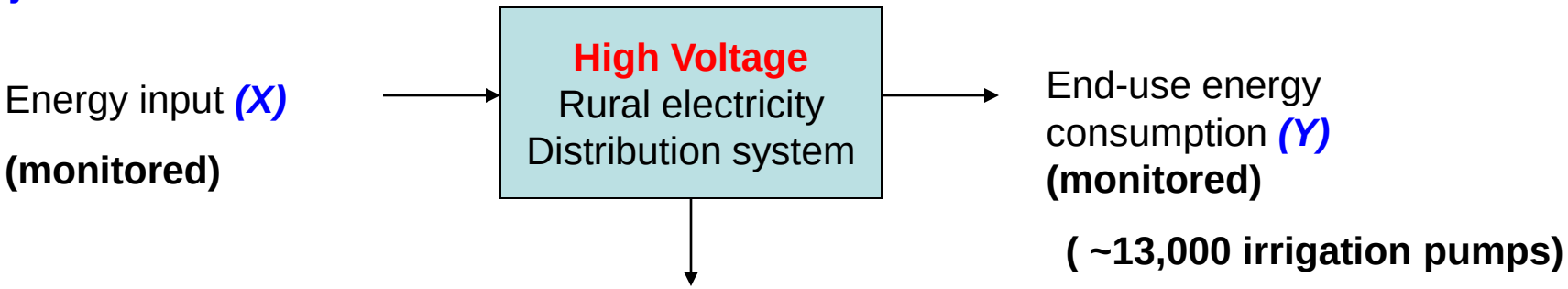
Revision of AMS-II.A:
Supply side energy efficiency improvements – transmission and distribution

Revision of AMS II.A: Supply side energy efficiency improvement-Transmission& Distribution

Baseline



Project



Reduced System losses ***(X-Y)*** approx 15% compared to baseline

Revision of AMS II.A

Procedure to determine baseline technical loss (Now):

- Measured performance of the equipment **OR**
- Performance of the existing equipment as per a national standard or international standard or manufacturer's specification

- Issues/ Request for revision:
  - No national/international standards available to measure system-wide performance (e.g., distribution system)
  - Making use of manufacturer data is not relevant as loss reduction activity in distribution system depends upon load connected and specifications related to T&D system in the region/country
  - No calculation procedures currently provided in AMS-II.A

Revision of AMS II.A

Proposed revision:

- The **baseline technical loss** using a peer-reviewed method e.g., **method reviewed** in International Institute of Electrical and Electronic Engineers **(IEEE) literature** that is also included in the **guidelines of a relevant national level agency** (e.g, rural electrification corporation);
  - Estimation method **limited to rural electricity distribution networks** and the relevance of and **justification** for using the method should be detailed in **PDD**.
  - As per literature estimation method is **conservative compared to measurement method** *(P. S. N Rao, R. Deekshit, "Energy Loss Estimation in Distribution Feeders", IEEE Trans. Power Del., Vol.21, no3, pp. 1092-1100, July 2006).*
- **Technical loss during the project** is chosen as greater of the two: **measured and estimated**.

Revisions also include:

- Elaboration on types of technical losses covered under AMS-II.A;
- Board's guidance on equipment lifetime.

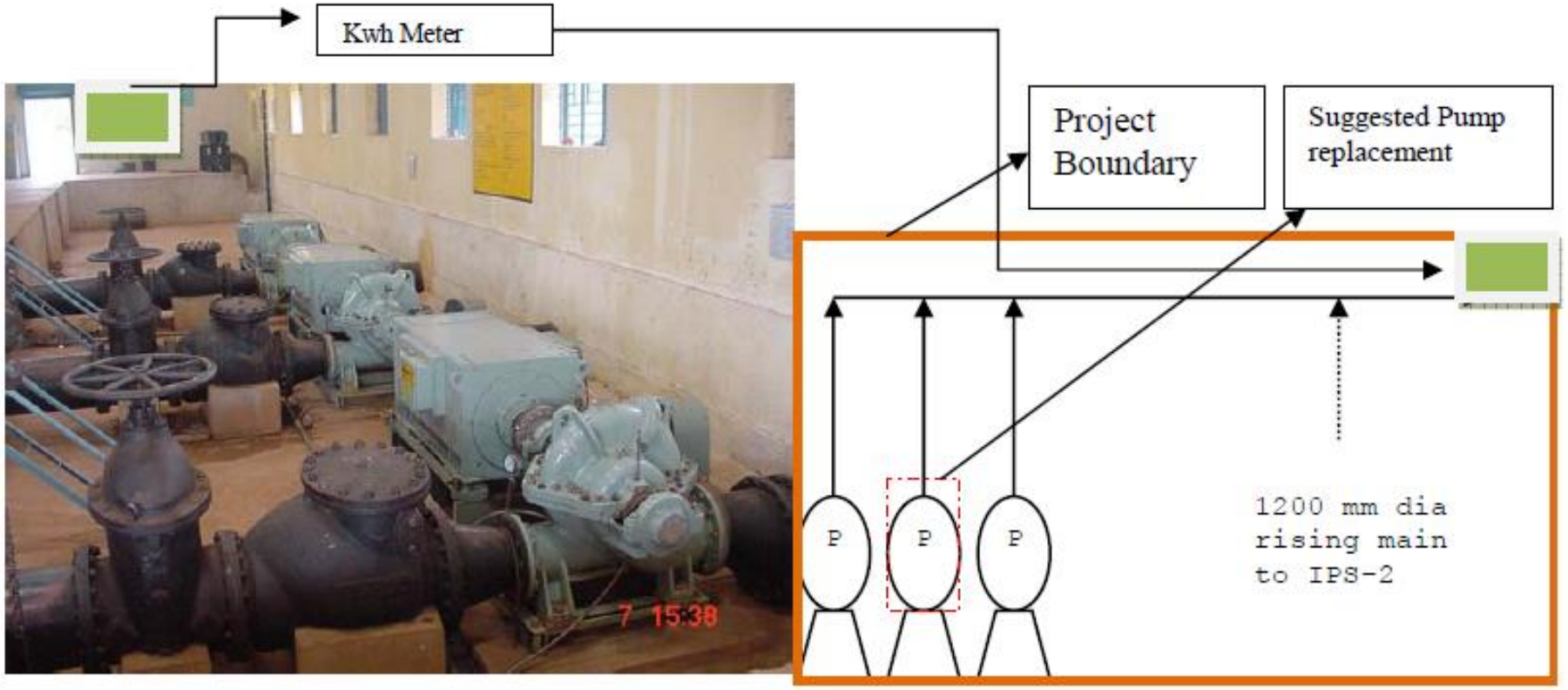
Other relevant information:

- Only one project under validation using the methodology

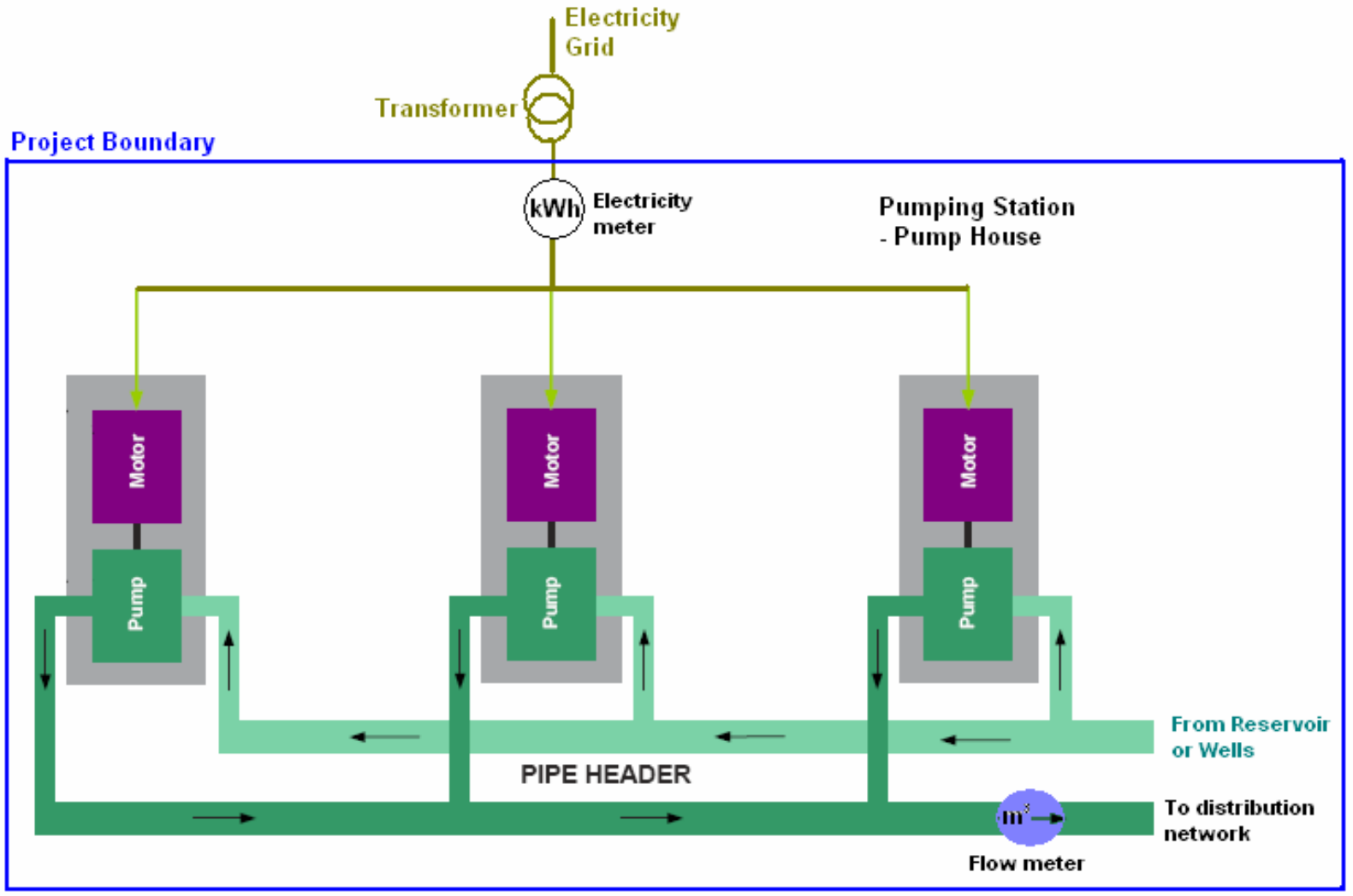
Annotation Agenda # 30

Revision of AMS-II.C:
Demand-side energy efficiency activities for specific technologies

Revision of AMS-II.C



Revision of AMS-II.C



Revision of AMS-II.C

- Option to **expand the boundary to encompass the entire system** introduced
- **Baseline (current)** Option 1: the **product** of the baseline **energy consumption of equipment/appliances** and the **emission factor** for the electricity displaced:
- **Baseline (new option)** Option 2: The **specific energy consumption** of the system in the baseline **times the output** in project year y **times the emission factor** for the electricity displaced. This option **can only be used where comparable conditions for the output in the baseline and project** can be established. For example in the specific case of a **water pumping** system comparable conditions can be established by one of the options below;
  - Show that average **baseline water flow rate (discharge)** is within **+/- 10% of the flow rate during the project** ;
  - Choose the **nameplate head and discharge specifications of the baseline pump** and corresponding power/energy consumption (weighted average values can be used when pumps are operated in parallel) for a conservative estimate

Annotation Agenda #31

Revision of AMS-III.A:
Urea offset by inoculant application in soybean-corn rotations on acidic soils on existing cropland

Revision of AMS-III.A

- Revision in response to SSC_303
- Broaden the combination of rotation crops (currently it is corn-soyabean) to other grass-legume combinations, a list of rhizobia species and major hosts (legumes) provided in the methodology
- Expand the type of N fertilizers allowed for use (currently it is only urea)
- New default emission factor for urea based on IPCC methods

Annotation Agenda #32

Revision of AMS-III.D:
Methane recovery in animal manure management systems

Revision of AMS-III.D

- Revision in response to SSC_305, **expand AMS III D** to include **manure transported from other locations than the farm at which the anaerobic digester is located**.
- Proposed revisions include transported manure if:
  - the **storage time after collection from animal barns, including transportation is short (< 24 hrs)** to prevent anaerobic decay or
  - the **dry matter content** of the **manure** when removed from the animal barns is **larger than 20%**

Annotation Agenda #33

Revision of AMS-III.E:
Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment

Revision of AMS-III.E

- Proposed revision is in response to submission SSC_307
- Monitoring under AMS III E currently includes:
  - quantity of **auxiliary fuel** used
  - quantity of **combustion residues**
  - **distance for transporting** the waste in the baseline and the project
- For many applications these monitoring requirements can be met (e.g. use of biomass for energy generation within the boundary)
- But not in the case of refuse derived fuel/stabilised biomass (**RDF/SB**) **sold in open market** due to **variable and numerous** end users
- Proposed revisions clarify that for RDF/SB sold in the open market, project emissions due to auxiliary fuel, transportation of final residues may be neglected under the condition
  - that RDF/SB is not eligible for a Type I (renewable energy) project component under the same project activity since it is not in the project boundary
  - the sale invoices of RDF/SB shall be maintained by the project

Annotation Agenda #34

Revision of AMS-III.F:
Avoidance of methane emissions through controlled biological treatment of biomass

Revision of AMS-III.F

- **Composting of manure** was **not covered under small scale methodologies**.
- **AMS-III.F covered both aerobic and anaerobic technologies** but was **limited to solid biomass waste**.
- **AMS-III.D** covered only the **anaerobic treatment** of animal manure.
- Proposed revisions **expand the applicability of AMS-III.F** to **include composting of manure**, **procedures of AMS-III.D** to calculate **baseline emissions** have been added.
- Other revisions: Option to use measured value of Biochemical Oxygen Demand ($BOD_{5,20}$) added to maintain consistency between AMS-III.F and AMS-III.H, editorial changes have been done

SSC Meth Methane Matrix

	BL: Manure (mainly lagoon) emissions, as per IPCC manure model	BL: Emissions from deposition in Solid waste disposal, as per IPCC FOD model	BL: Emissions from Waste water (mainly lagoon), as per IPCC wastewater model
PJ: Anaerobic digester, flare/combustion of methane	**AMS III D/** **AMS III R**	**AMS III F**	**AMS III H**
PJ: Aerobic Composting	**AMS III F**	**AMS III F**	NA
PJ: Aerobic WW treatment	NA	NA	**AMS III I**
PJ: Solids separation	**AMS III Y**	NA	**AMS III Y**
PJ: Controlled combustion of waste in SWDS	**NA**	**AMS III E**	**NA**
PJ: LFG capture and flare	**NA**	**AMS III G**	**NA**

Annotation Agenda #35

Revision of AMS-III.H:
Methane recovery in wastewater treatment

Revision of AMS-III.H

- AMS III.H allowed only **Water wash (Absorption with water) technology** for **upgrading biogas** for bottling or **feeding to natural gas distribution grid**
- **AM0053 (Biogenic methane injection to a natural gas distribution grid), in addition** to Absorption with water allows use of **Pressure Swing Adsorption technology** to produce the same result i.e.**97% methane content in the purified biogas**
- Proposed revisions of AMS III H include pressure swing absorption technology

Annotation Agenda #36

Revision of AMS-III.I: Avoidance of methane production in wastewater treatment through replacement of anaerobic systems by aerobic systems

Revision of AMS-III.I

- EB 47 revised AMS-III.H to include an **option to use measured value of BOD instead of a default value of COD** (0.21 kg methane per kg of COD), SSC_313 requested consistent changes in AMS-III.I.
- Proposed revisions now include option to use **baseline methane generation potential based on measured value** of Biochemical Oxygen Demand **($BOD_{5,20}$)**
- SSC_301 requested guidance on Methane Correction Factor (MCF) for secondary post treatment lagoons.
- Proposed revisions clarify that **methane correction factor of zero can be used**
  - when **Dissolved oxygen (DO) is monitored** to demonstrate that there are no anaerobic pockets (**DO level shall be 1 mg/L or above**) in the reactor during operation.
  - In case the operational parameters are **not within these limits** or anaerobic pockets with DO values of less than 1 mg/L are found for a period of time, **a MCF value of 0.3** shall be taken for that period

Annotation Agenda #37

Revision of AMS-I.D: Grid connected renewable electricity generation

Revision of AMS-I.D

- Proposed revisions are in response to request for revisions (e.g. SSC_315)
- The current version of AMS I D requires *'metering the electricity generated by the renewable technology".*
  - Metering net electricity supplied to grid which is metered at grid interface **versus** the gross electricity generated metered at the generation end
- Proposed revisions clarify that *'metering the electricity supplied by the **renewable technology to the grid**'* **cross checked with records for sold electricity** is required consistent with ACM002 requirements
  - Electricity supply to grid monitored at the grid interface represents the actual renewable electricity generation displacing grid electricity mix.
  - Metering electricity at grid interface is the net of station use and losses occurring in transformer/switchgear/transmission line etc.
- Procedures on project emission calculations for geothermal project activities consistent with ACM002 requirements
- Editorial changes (e.g., consistent nomenclature in equations).

Annotation Agenda #38

Revision of AMS-I.C: Thermal energy production with or without electricity

Revision of AMS-I.C

- AMS I C currently requires that 'Efficiency of the baseline units is determined as (order of preference):
  - Highest annual measured operational efficiency of a unit with similar specifications, using baseline fuel
  - Highest of the annual operational efficiency values provided by two or more manufacturers
- Revisions clarify that
  - Highest measured operational efficiency over the full range of operating conditions of a unit with similar specifications, using baseline fuel. The efficiency tests shall be conducted following the guidance provided in relevant national / international standards;
    - a representative sample can be chosen for projects involving household systems that are < 45 kW thermal
  - Highest of the operational efficiency values provided by two or more manufacturers for units with similar specifications, using the baseline fuel;