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# Energy Management in Sustainable Eco-Cities of Monarchy of Concordia

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**ABSTRACT**

Noise is defined as a sensation of unwanted intensity of a wave. It is perception of a pollutant and a type of environmental stressor. The unwanted intensity of a wave is a propagation of noise due to transmission of energy source waves (viz. physical agents) such as sun, light, sound, heat, electricity, fluid and fire. Human Noise Behavior is checked by identifying a source and a sink of noise i.e., a person making noise and a person affected by such noise. The Monarchy of Concordia is a globalized society with the objective of maintaining peace and harmony in the world by controlling human noise behavior. Sustainable Eco-Cities in the monarchy of Concordia follow rules of low carbon economy. The eco-city concept involves sustainability goals. Minimal noise is generated in energy and noise systems and noise behavior is checked by proper noise monitoring and instrumentation which results in noise reduction in cities. The monarchy of Concordia has proposed business models in which various international governments and people are charged subscription fees, taxes and fines on noise behavior and creating noise pollution in similar lines with climate change with applicability of energy perspective on a per capita basis. Examples of energy intensities and noise calculations based on newly devised noise scales are also elaborated.

**Keywords:** monarchy of Concordia, human noise behavior, sustainable eco-cities, environment, climate change, energy management

## 1. INTRODUCTION

Physical principles are central to the knowledge of energy, energy conversion and noise associated to understand energy technologies and their inherent benefits, risks and problems. Emphasis on clean energy and transportation technologies with focus on generation of no or minimal noise is dependent on energy policy framework for controlling noise and human noise behavior, viz., identifying a source and a sink of noise i.e., a person making noise in the environment and a person affected by such noise in the environment. Energy society, from the ancient to the most modern highly industrialized includes an assembly of wave motions. These wave motions include examples such as motion of animals, motion of water, growing of plants, rolling of automobiles, flying of arrows, flying of birds, airplanes and so on. To monitor and control human noise behavior, it is essential to incorporate these guiding principles of energy perspectives into a globalized society. For this purpose, monarchy of Concordia is established. The Monarchy of Concordia has motto of "Controlling Human Noise Behavior" with guiding principles of energy perspectives in a society. To monitor and control human noise behavior, it is essential to incorporate the guiding principles of energy perspectives into a globalized society. For this purpose, monarchy of Concordia is established. This establishment is aiming to overcome the globalization process and its ill effects. The monarchy of Concordia, as a globalized society is also aiming to eradicate impoverished economies of nations and low standard of living. Figure 1 presents overview of five wings of monarchy of Concordia. The paper has presented a brief description of noise scales and charts invented by the author [1-15]. Appendix A has presented an example of energy intensities and noise calculations for an outdoor duct exposed to solar radiation. Appendix B has presented the IoT Scheme for noise characterization and measurement.

### *1.1 Monarchy of Concordia: Organization Definition*

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Business in Monarchy of Concordia (MoC) means "Industrial Business". MoC is engaged in the process of production of one or the other products, services, commodities and articles. Thus MoC's social business wealth or money in one or other forms is used to produce more wealth or money, which is further invested and used in social business and economic systems. This social business system keeps money rolling, active and in this process, it meets the needs of the people who are the consumers of the goods, products and services of MoC. MoC's organization is the harmonious combination and utilization of various factors of production, including employees, workers, materials, equipment and machines. MoC's business activity has three stages, namely Industry, Commerce and Trade. In industry, goods in the required form are made or produced. Commerce looks after financing, transportation, insurance aspect related activities. Mixed Economic System in Monarchy of Concordia (MoC): MoC's operations follow mixed economic system of a joint stock entity by combination of private partnership cum sole ownership. Social welfare is the primary objective with profit making under different operating business models. Profit making is defined not only in terms of monetary benefits but also under social resource benefits from the five wings of MoC in the form of value estimation of goods, services, products and equipment with sustainable development agenda endorsed by Royal Bank of Concordia.

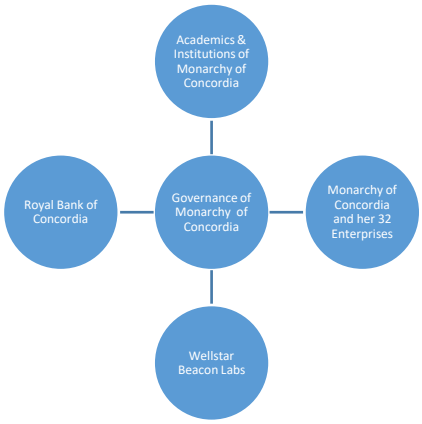


Fig 1 Five Wings of Monarchy of Concordia

### *1.2 Monarchy of Concordia: Objectives & Agenda*

To come into existence through endorsement of the 'Monarchy of Concordia' with her force majeure;
To maintain peace & harmony in the World through control of human noise behavior;
To establish Rajpura, Punjab as Principal Capital for Governance of 'Monarchy of Concordia' through President of India and/or resolution in Parliament of India and/or Punjab Assembly;
To establish Monarchy of Concordia's thirty-two enterprises and Royal Bank of Concordia, with commercial capital/headquarter in Montréal and considering the nature of enterprises, pass resolution in Canadian Parliament to make them exempt for paying any taxes and custom duties;
*Optional: To form *Sindhudesh* through joint territory and common program of India, Pakistan, Bangladesh and Myanmar; Governments and Constitutions of India, Pakistan, Bangladesh, Myanmar are jointly operated until adoption of common constitution; To open up trade & commerce activities in all the territories of *Sindhudesh*;

## 2 NOISE CHARACTERIZATION

A unified theory for stresses and oscillations is proposed by the author [1]. The following standard measurement equations are derived and adopted from the standard definitions for sources of noise interference [1-23].
Noise of Sol: For a pack of solar energy wave, the multiplication of solar power storage and the velocity of light gives solar power intensity I. On taking logarithm of two intensities of solar power, $I_1$ and $I_2$, provides intensity difference. It is mathematically expressed as:

$$Sol = \log(I_1)(I_2)^{-1} \quad (1)$$

Whereas logarithmic unit ratio for noise of sol is expressed as *Sol*. The oncisol (oS) is more convenient for solar power systems. The mathematical expression by the following equality gives an oncisol (oS), which is 1/11$^{th}$ unit of a *Sol*:

$$oS = \pm 11\log(I_1)(I_2)^{-1} \quad (2)$$

Noise of Therm: For a pack of heat energy wave, the multiplication of total power storage and the velocity of light gives heat power intensity I. The pack of solar energy wave and heat energy wave (for same intensity I), have same energy areas, therefore their units of noise are same as *Sol*.
Noise of Scattering: For a pack of fluid energy wave, the multiplication of total power storage and the velocity of fluid gives fluid power intensity I. On taking logarithm of two intensities of fluid power, $I_1$ and $I_2$, provides intensity difference. It is mathematically expressed as:

$$Sip = \log(I_1)(I_2)^{-1} \quad (3)$$

Whereas, logarithmic unit ratio for noise of scattering is *Sip*. The oncisip (oS) is more convenient for fluid power systems.
The mathematical expression by the following equality gives an oncisip (oS), which is 1/11$^{th}$ unit of a *Sip*:

$$oS = \pm 11\log(I_1)(I_2)^{-1} \quad (4)$$

For energy area determination for a fluid wave, the water with a specific gravity of 1.0, is the standard fluid considered with power of ±1 $Wm^{-2}$ for a reference intensity $I_2$.

Noise of Elasticity: For a pack of sound energy wave, the product of total power storage and the velocity of sound gives sound power intensity I. On taking logarithm of two intensities of sound power, $I_1$ and $I_2$, provides intensity difference. It is mathematically expressed as:

$$Bel = \log(I_1)(I_2)^{-1} \quad (5)$$

Whereas, logarithmic unit ratio for noise of elasticity is *Bel*. The oncibel (oB) is more convenient for sound power systems. The mathematical expression by the following equality gives an oncibel (oB), which is $1/11^{th}$ unit of a *Bel*:

$$oB = \pm 11\log(I_1)(I_2)^{-1} \quad (6)$$

There are following elaborative points on choosing an *onci* as $1/11^{th}$ unit of noise:

Reference value used for $I_2$ is -1 W $m^{-2}$ on positive scale of noise and 1 W $m^{-2}$ on negative scale of noise. In a power cycle, all types of wave form one positive power cycle and one negative power cycle [2]. Positive scale of noise has 10 positive units and one negative unit. Whereas, negative scale of noise has 1 positive unit and 10 negative units;

Each unit of sol, sip and bel is divided into 11 parts, 1 part is $1/11^{th}$ unit of noise;

The base of logarithm used in noise measurement equations is 11;

Reference value of $I_2$ is -1 W $m^{-2}$ with $I_1$ on positive scale of noise, should be taken with negative noise measurement expression (see Eqs 2, 4 and 6), therefore it gives positive values of noise; Reference value of $I_2$ is 1 W $m^{-2}$ with $I_1$ on negative scale of noise, should be taken with positive noise measurement expression (see Eqs 2, 4 and 6), therefore it gives negative values of noise. The choosing of *onci* in noise units is done so as to have separate market product & system of noise scales and their units distinguished from prevailing *decibel* unit (which has its limitations) in the International System of Units. More discussions on energy conversion, noise characterization theory and choice of noise scales and its units are presented in many papers by the author [1-15].

Fig 2 has presented a double-sided hexagonal slide rule with seven edges for noise measurement representing seven sources of noise. Reference value used for $I_2$ is -1 W $m^{-2}$ on positive scale of noise and 1 W $m^{-2}$ on negative scale of noise. Positive scale of noise has 10 positive units and one negative unit. Whereas, negative scale of noise has 1 positive unit and 10 negative units. Each unit of sol, sip and bel is divided into 11 parts, 1 part is $1/11^{th}$ unit of noise. The base of logarithm used in noise measurement equations is 11. Table 1 has summarized noise calculation charts.

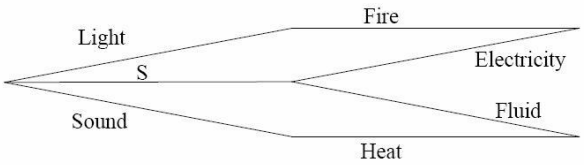


Fig 2 A Double-Sided Hexagonal Scales of Noise with Seven Edges (S denotes Sun)

Table 1 Noise calculation chart estimating onci Sol, onci Sip and onci Bel

| a | b | Intensity Ratio ($11^a$) | Pressure Ratio ($11^b$) | ←oSol→ ←oSip→ ←oBel→ | Pressure Ratio $(1/11)^b$ | Intensity Ratio $(1/11)^a$ |
|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 0 | 1 | 1 |
| 1/11 | 1/22 | 1.244 | 1.115 | ± 01 | 0.897 | 0.804 |
| 2/11 | 2/22 | 1.546 | 1.244 | ± 02 | 0.804 | 0.647 |
| 4/11 | 4/22 | 2.392 | 1.546 | ± 04 | 0.647 | 0.418 |
| 6/11 | 6/22 | 3.699 | 1.923 | ± 06 | 0.520 | 0.270 |
| 8/11 | 8/22 | 5.720 | 2.392 | ± 08 | 0.418 | 0.175 |
| 10/11 | 10/22 | 8.845 | 2.974 | ± 10 | 0.336 | 0.113 |
| 12/11 | 12/22 | 13.679 | 3.699 | ± 12 | 0.270 | 0.073 |
| 14/11 | 14/22 | 21.155 | 4.599 | ± 14 | 0.217 | 0.047 |
| 16/11 | 16/22 | 32.715 | 5.720 | ± 16 | 0.175 | 0.031 |
| 18/11 | 18/22 | 50.594 | 7.113 | ± 18 | 0.141 | 0.020 |
| 20/11 | 20/22 | 78.242 | 8.845 | ± 20 | 0.113 | 0.013 |
| 22/11 | 22/22 | 121.000 | 11.000 | ± 22 | 0.091 | $8.264 \times 10^{-3}$ |
| 24/11 | 24/22 | 187.124 | 13.679 | ± 24 | 0.073 | $5.344 \times 10^{-3}$ |
| 26/11 | 26/22 | 289.383 | 17.011 | ± 26 | 0.059 | $3.456 \times 10^{-3}$ |
| 28/11 | 28/22 | 447.525 | 21.155 | ± 28 | 0.047 | $2.235 \times 10^{-3}$ |
| 30/11 | 30/22 | 692.089 | 26.308 | ± 30 | 0.038 | $1.445 \times 10^{-3}$ |
| 32/11 | 32/22 | 1070 | 32.715 | ± 32 | 0.031 | $9.343 \times 10^{-4}$ |
| 34/11 | 34/22 | 1655 | 40.684 | ± 34 | 0.025 | $6.042 \times 10^{-4}$ |
| 36/11 | 36/22 | 2560 | 50.594 | ± 36 | 0.020 | $3.907 \times 10^{-4}$ |
| 38/11 | 38/22 | 3959 | 62.917 | ± 38 | 0.016 | $2.526 \times 10^{-4}$ |
| 40/11 | 40/22 | 6122 | 78.242 | ± 40 | 0.013 | $1.633 \times 10^{-4}$ |
| 42/11 | 42/22 | 9467 | 97.300 | ± 42 | 0.010 | $1.056 \times 10^{-4}$ |
| 44/11 | 44/22 | 14640 | 121.0 | ± 44 | $8.264 \times 10^{-3}$ | $6.830 \times 10^{-5}$ |
| 46/11 | 46/22 | 22640 | 150.47 | ± 46 | $6.646 \times 10^{-3}$ | $4.417 \times 10^{-5}$ |
| 48/11 | 48/22 | 35020 | 187.12 | ± 48 | $5.344 \times 10^{-3}$ | $2.856 \times 10^{-5}$ |
| 50/11 | 50/22 | 54150 | 232.70 | ± 50 | $4.297 \times 10^{-3}$ | $1.847 \times 10^{-5}$ |
| 66/11 | 66/22 | $1.772 \times 10^{6}$ | 1331 | ± 66 | $7.513 \times 10^{-4}$ | $5.645 \times 10^{-7}$ |
| 77/11 | 77/22 | $1.949 \times 10^{7}$ | 4414 | ± 77 | $2.265 \times 10^{-4}$ | $5.132 \times 10^{-8}$ |
| 88/11 | 88/22 | $2.144 \times 10^{8}$ | 14640 | ± 88 | $6.830 \times 10^{-5}$ | $4.665 \times 10^{-9}$ |
| 99/11 | 99/22 | $2.358 \times 10^{9}$ | 48560 | ± 99 | $2.059 \times 10^{-5}$ | $4.241 \times 10^{-10}$ |
| 110/11 | 110/22 | $2.594 \times 10^{10}$ | 161100 | ± 110 | $6.209 \times 10^{-6}$ | $3.855 \times 10^{-11}$ |
| Example: To find oSol corresponding to a pressure ratio of 363 Ratio of 363 = 11X33; In oSol = +22+32 oSol = +**54 oSol** | | | | | | |

## 3 BUSINESS MODEL DISCUSSIONS

Let us think in a broader and a bigger perspective of "Controlling Human Noise Behavior"; which will help maintaining peace and harmony in the World and would also benefit many people across the Globe. Understanding of situation/circumstances around

people leads logically to better prediction and control of noise behavior. The successful prediction of a "Human Noise Behavior" must be based on a thorough knowledge of the stimuli which provoke such behavior among human population. In a relatively simple situation, we can control the antecedent causes of noise behavior to a far greater degree than in complex situations; and the resulting prediction of noise behavior is more certain and more precise because of this control. We do not know the motives for impelling the group/population. For many reasons, the prediction and control of group (and of national/state/govt. & religious bodies) noise behavior are exceedingly difficult. Again, if we can be reasonably sure of the major motives, it may be impossible to arrange conditions to control present motives. In general, self-interest, desire for prestige or for security, and strong emotional needs (for affection, appreciation, and the like) are dependent on social motives. Kindly note that progress in understanding as well as in predicting and controlling human noise behavior will come not through divination or intuition, but through establishment of five wings of monarchy of Concordia and by careful research in which the methods and techniques of science are employed. The economy is in slowdown and countries are in never ending debt and their expenditures exceed their revenue. So, what is cost of purchasing the governments/countries, if they have no income from "Governance" and only revenue from taxes? The point is that all countries/governments are on the verge of collapse of their revenue models (i.e., are bankrupt or on the verge of bankruptcy). So if governments are in debts and their revenue models are not working for benefit to the people, its people's money. Since concerned governments/authorities in various countries would agree that no taxes shall be applicable to Monarchy of Concordia, therefore people will only pay for products/goods/services and employees/workers would not be charged any income taxes. It will stop all the malpractices/unethical dealings. So, for governance of Monarchy of Concordia if any client/customer/group has to avail some work/services, the client/customer has to sign agreement and pay Monarchy of Concordia only after doing/availing of services depending on its nature on a case to case basis. Therefore, it is very important for selection of employees/ministers of Monarchy of Concordia. All employees/ministers will be enrolled as employees or consultants and all income would be of Monarchy of Concordia with revenue sharing on a case to case basis. Income from Noise Behavior, Legislation, Treatment & Therapy: There will be subscription fees/charge/surcharge taxes/fines with people/governments on Noise Behavior and creating noise pollution on a case to case basis. The applicable formula for charging on noise behavior will be on similar lines with climate change with addition/applicability on noise scales/slide rule invented by the author with energy principle/perspective on a per capita basis. All the necessary systems and its frame work must have to be placed for such purposes. These courts would work in all the countries (with endorsement) just like an environment/traffic police magistrate/inspector. Lot of work must be done on policies framework of Monarchy of Concordia, before enrolling ministers/employees. Sustainable Eco-Cities in the monarchy of Concordia follow rules of zero waste in its economy. The eco-city concept involves sustainability goals in cities, with transport, energy and buildings with smart city services. The importance is given to urban landscape and agriculture. Waste energy through energy conversion in industries is properly reduced and recycled. The importance is given to sustainable technologies of efficient energy conversion, energy conversion in engines, solar energy, power & energy systems, wind energy conversion, geothermal energy systems, building energy systems, waste management, waste to energy conversion and resource recovery. Minimal noise is generated in energy and noise systems and noise behavior is checked by proper noise monitoring and instrumentation which results in noise reduction in cities. The monarchy of Concordia is proposing business models in which various international governments and people are charged taxes and fines on noise behavior and creating noise pollution in similar lines with climate change with applicability on noise scales invented by the author with energy perspective on a per capita basis. The concept of zero waste of circular economy is realized for better economy, growth and sustainable development in these eco-cities. In the monarchy of Concordia, as a globalized society, there are no income taxes on its enterprises and employees. The upshot of the business between "Monarchy of Concordia" and "Rest of the World" is most likely dependent on becoming member of the United Nations (UN). The becoming of member of the UN is getting 2/3rd majority in the UN general assembly with prior approval of UN Security Council.

## 4 CONCLUSIONS

The paper has presented the concept of globalized society of "Monarchy of Concordia", its objective along with its motto of "Controlling Human Noise Behavior".

The paper has presented noise measurement characterization system with utility of a slide rule. Noise calculations charts are presented for calculating noises of oncisol, oncisip and oncibel based on pressure and intensity ratios. The paper has elaborated on low-carbon economy/energy management business model along with discussions on practical modalities on controlling human noise behavior. The paper has presented the novel concept of energy management by defining energy intensities, energy conversion and noise in sustainable eco-cities of the monarchy of Concordia. Full globalization requires the harmonization of trade regulations and laws across countries. Such harmonization would require a global government. To overcome all such barriers and national sovereignty issues, a globalized society for maintaining peace and harmony among nations through monitoring and controlling human noise behavior of the world came into existence by establishing sovereign political power of monarchy of Concordia. This matter should be urgently put before United Nations for getting Endorsement. This will clear the path for assuring secure funding of 'Monarchy of Concordia' through establishment of 'Royal Bank of Concordia'. Kindly visit the websites http://concordia.global/ and http://wellstar-labs.com/ for more information. This YouTube video explains the concept of Controlling Human Noise Behavior in the Monarchy of Concordia: https://youtu.be/KwxxbYvmP1c.

## APPENDIX A Exterior Air Duct Example

Table A1 Temperature difference and noise of sol with solar irradiation

| Solar irradiation ($Wm^{-2}$) | Air Temperature Difference (ΔT) °C | Noise of Sol oS (oncisol) |
|---|---|---|
| 450 | 15.50 | 28 |
| 550 | 18.90 | 28.93 |
| 650 | 22.40 | 29.7 |
| 750 | 25.90 | 30.36 |
| 850 | 29.40 | 30.91 |

Table A2 Temperature difference and noise of scattering with air velocity

| Air velocity ($ms^{-1}$) | Fluid Power ($Wm^{-2}$) | Air Temperature Difference (ΔT) °C | Noise of Scattering oS (oncisip) |
|---|---|---|---|
| 1.35 | 47.62 | 15.28 | 17.72 |
| 1.05 | 37.0 | 18.22 | 16.50 |
| 0.75 | 26.45 | 22.40 | 15.02 |
| 0.45 | 15.87 | 28.15 | 12.65 |
| 0.15 | 05.29 | 29.80 | 07.64 |

Table A3 Mass flow rate and noise of therm with (ΔT) °C

| (ΔT) °C | Mass flow rate ($Kg\ s^{-1}$) | Thermal Power ($Wm^{-2}$) | Noise of therm oS (oncisol) |
|---|---|---|---|
| 15.28 | 0.0231 | 117.65 | 21.868 |
| 18.22 | 0.0171 | 103.85 | 21.296 |
| 22.40 | 0.0120 | 89.6 | 20.614 |
| 28.15 | $8.1 \times 10^{-3}$ | 76.0 | 19.866 |
| 29.80 | $6.2 \times 10^{-3}$ | 61.59 | 18.898 |

Table A4 Noise of elasticity with air particle velocity (Impedance $Z_0 = 413\ N{\cdot}s{\cdot}m^{-3}$ at 20°C)

| Air velocity ($m{\cdot}s^{-1}$) | Fluid Power ($W{\cdot}m^{-2}$) | Noise of Scattering oS (oncisip) | Sound Pressure ($N{\cdot}m^{-2}$) | Sound Power Intensity ($W{\cdot}m^{-2}$) | Noise of Elasticity oB (oncibel) |
|---|---|---|---|---|---|
| 1.35 | 47.62 | 17.72 | 557.5 | 752.7 | 30.36 |
| 1.05 | 37.0 | 16.50 | 433.65 | 455.33 | 28.05 |
| 0.75 | 26.45 | 15.02 | 309.75 | 232.31 | 24.97 |
| 0.45 | 15.87 | 12.65 | 185.85 | 83.63 | 20.24 |
| 0.15 | 05.29 | 07.64 | 61.94 | 09.29 | 10.12 |

Table A5 Input Data and Mathematical Superposition

| Noise of Scattering oS (oncisip) (A1) | Noise of therm oS (oncisol) (A2) | Noise of Elasticity oB (oncibel) (A3) | Simple Mathematical Superposition (Say oncibel) from Table 1 by adding corresponding intensity ratios |
|---|---|---|---|
| 17.72 | 21.868 | 30.36 | 31.2 |
| 16.50 | 21.296 | 28.05 | 29.2 |
| 15.02 | 20.614 | 24.97 | 26.5 |
| 12.65 | 19.866 | 20.24 | 23.6 |
| 07.64 | 18.898 | 10.12 | 19.8 |

## APPENDIX B IoT Layout – Proposed system

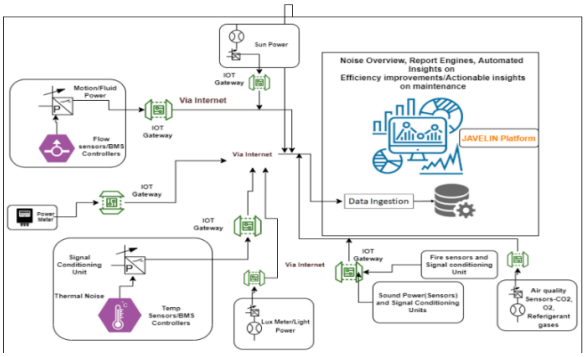


Fig 3 IoT Layout for noise characterization and measurement

**Data points for IoT Scheme:** Thermal Power: i) Temperature Difference; ii) specific heat ($J\ kg^{-1}\ K^{-1}$); iii) Mass flow rate (kg/sec) iii) acting area (sq. m)

Motion/Fluid Power: i) Velocity of fluid (m/sec), object, damper, torque/pressure difference; ii) Mass flow rate (kg/sec) iii) acting area (sq. m); iv) formulas attached; Sound Power: i) Sound Pressure ($N{\cdot}m^{-2}$); ii) Sound Power Intensity ($W{\cdot}m^{-2}$); iii) Impedance $N{\cdot}s{\cdot}m^{-3}$; iv) Air particle velocity (m/sec) Electric Power: i) Demand load (Watts) VA; ii) acting area (sq. m)

Light Power: i) Wattage of Illumination (Lux); ii) acting area (sq. m); Sun Power: i) Solar Irradiation intensity ($W \cdot m^{-2}$); Fire Power (Say in the Boiler): i) Fire power intensity = Light Power + Thermal power + Fluid Power; Temperature Difference; ii) specific heat ($J\ kg^{-1}\ K^{-1}$); iii) Mass flow rate (kg/sec) iv) acting area (sq. m); Dust: SPM, Carbon Monoxide, Carbon Dioxide, Refrigerant Gas

**Stepwise procedure for noise characterization:**

Step 1: Data points are recorded with the help of sensors and evaluate the thermal power, solar power, fluid/motion power, lux intensity and fire power.

Step 2: Develop algorithms and find the log values of each noises (thermal power, solar power, fluid/motion power, lux intensity and fire power).

Step 3: Optimize the noise power with help of reference/standard value (Use appropriate optimization tool).

Step 4: Connect to IOT platforms and monitoring noise power associated with each utilities.

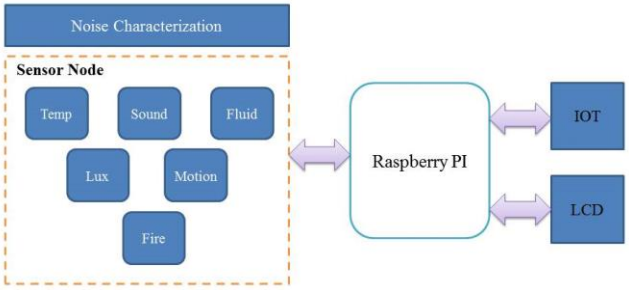


Fig 4 A noise characterization and measurement system

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