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Wireless Power Theft Monitoring

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ABSTRACT—

Power theft constitutes a considerable problem currently, leading to large financial losses for utility companies. As a result, prices are increased to conceal these losses. Preventing these thefts will enable us to conserve a substantial quantity of energy. Monitoring electricity use facilitates the discovery of appropriate energy reduction opportunities. Monitoring the electricity meter readings is crucial for understanding total energy consumption. The traditional approach to power theft entails affixing tags to the wires of feeder lines for field motors and analogous uses. By monitoring current flow via the load and leveraging energy feedback, we will reduce power theft by implementing a breaker. A microcontroller is connected to a power line/feeder via current sensors through a fundamental current sensing circuit, a Wi-Fi communication link, and a contactor to initiate or terminate the connection. A personal computer at the substation is linked via Wi-Fi to communicate with all energy meters and a buzzer. Under standard settings, the microcontroller incessantly observes the current value/ratio in the feeder lines.

Keywords— Electrical power theft, wireless data transmission and receiving, tapping, meter tampering, anti- theft drives, Improvement in Key Performance Indicators (KPI)

Introduction :

Electricity theft is associated with governance indices, occurring more frequently in nations marked by insufficient accountability, political instability, ineffective administration, and high levels of corruption. Simply increasing electricity supply will not suffice to meet current demands. To enhance the efficiency of generated power, it is essential to consistently monitor power consumption and losses. In our country, electricity theft varies between 3% and 30%. The illicit use of power may indirectly impact our nation's economic status. The project 'Wireless Power Theft Monitoring System in Power Lines' focuses on the detection and monitoring of electricity theft in power lines. The suggested system safeguards against unauthorized electricity consumption. The problem of unlawful electricity use can presently be mitigated by technological solutions due to improvements in technology. The project 'Wireless Power Theft Monitoring System in Power Lines' focuses on the detection and monitoring of electricity theft in power lines. The suggested system safeguards against unauthorized electricity consumption. The problem of unlawful electricity use can presently be mitigated by technological solutions due to improvements in technology.

Theft of Power

These power outages are intentionally caused by individuals via unauthorized access to power distribution networks. This represents the stealing of electricity. Electricity theft is categorized as a non-technical loss. The pilferage of electricity is anticipated to result in substantial yearly revenue deficits in India. All utilities strive to reduce losses caused by theft. Technological advancements can substantially reduce technical losses. A systematic plan is essential to prevent economic losses, especially from theft. Electricity theft involves the alteration of meters to reflect diminished readings. By passing a meter.

1. Billing irregularities.
2. Direct hooking to LT line.
3. Usage of power more than contracted, especially by agriculture consumers.

The theft of energy by direct tapping of long LT lines passing through agricultural fields in rural areas or town feeders cause over loading of the system and lead to consequential failure of transformer.

A. Reduction In Theft Of Power

A just one percent decrease in transmission and distribution losses will provide substantial benefits for utilities, considering the vast quantity of electricity handled by DISCOMs. A systematic approach is crucial to reduce financial losses due to theft. The reduction of commercial loss can be achieved at a lower cost and in a shorter duration. Routine evaluations by a professional oversight committee can substantially reduce theft.

B. Methods Of reduction Of Theft Of Power

- **Technical/Engineering Methodology:**

Electric power is a well-established technology, and recent advancements have enhanced the installation and maintenance of highly efficient systems. Many power systems inadequately devote resources and effort to Transmission and Distribution (T&D) Systems and neglect to adopt the latest technologies. The investment necessary to reduce losses includes the improvement of power lines, transformers, information technology monitoring systems, and the installation and maintenance of modern metering systems that interface with electricity users.

- **Managerial Method:**

Distribution businesses are significant entities that operate as bureaucracies, even though they are primarily private sector firms. Combining strong technical improvements with proactive anti-theft measures may produce significant progress. Corruption poses a substantial obstacle for Distribution Companies, as power theft occurs with the collusion of personnel within the power organization. Increased oversight and surveillance may exacerbate corruption. Employees may coerce payments from electricity consumers to mask theft. Employees ought to earn adequate remuneration to guarantee their contentment. One should not resort to bribery to support a family.

Power Theft Detection

The digital energy meter (M1) will measure the power utilized by the load (L1) over a designated period. It will communicate data in proportion to the consumed power to the receiver through a wireless digital data transmitter. The receiver on the pole system will acquire data transmitted by the transmitter in the load-side meter. The receiver will relay it to the microcontroller. The energy meter on the pole will measure the power sent over line 1 and provide the pertinent data to the microcontroller. The microcontroller currently possesses two measurements: the power calculated at the pole and the power absorbed by load (L1), During a designated interval, a divergence will occur between the meter reading (M1) and the pole-based reading. The microcontroller will evaluate the two readings, and if the measured value at the pole surpasses the value supplied by meter (M1) by a predetermined tolerance, then power theft is occurring on line 1. The theft signal generated by the pole system can be transmitted to the substation by either power line communication or wireless technology, based on the most appropriate and cost-effective option.

Importance of Wireless Power Theft Monitoring

- **Reduced Revenue Losses:**

Power theft leads to significant financial losses for power companies, impacting their ability to invest in infrastructure and provide reliable service.

- **Improved Efficiency:**

By detecting and preventing theft, these systems improve the overall efficiency of the power grid.

- **Fair Distribution of Electricity:**

Wireless monitoring ensures that electricity is distributed fairly to all consumers and that those who are not paying their fair share are held accountable.

- **Reduced Load Shedding:**

Power theft can lead to increased demand and strain on the grid, potentially causing load shedding and disruptions to businesses and homes.

- **Improved Safety:**

In some cases, power theft can create dangerous situations, such as faulty wiring or illegal connections. Monitoring systems can help identify and address these safety hazards.

- **Data-driven Insights:**

Smart meters and other monitoring systems provide valuable data on electricity consumption patterns, which can be used to optimize grid operations and improve energy management.

Define abbreviations and acronyms at their first occurrence in the text, irrespective of any preceding definitions in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not require definition. Refrain from using acronyms in the title or headings unless it is essential.

Working:

Wireless power theft monitoring systems utilize sensors and wireless communication to detect and alert authorities about unauthorized electricity usage. These systems evaluate power consumption data from several sources (e.g., transformers, consumers) to identify anomalies indicative of theft. Upon detection, the system can initiate alerts and potentially disconnect power to the affected area.

Methodology:

The power board will deliver energy via an RF transmitter. The RF receiver at the user end receives the transmitted power from the Electricity Board and subsequently acknowledges the power reception by activating a micro switch. The acknowledgment data will be transmitted to the main office via an RF transmitter. This is the essential operational strategy employed in the proposed technique.

While coming to the part of Theft- identification, there are 2 stages of Detection:

- Alarm beep, with message alert
- Fine levied, with message intimation

Result and Future Enhancement:

The proposed system includes solutions aimed at rectifying all prior deficiencies. This program will reduce the superfluous expenses related to the presentation of energy meter readings at the Electricity Board, hence improving overall efficiency. A portable solution can be offered to the energy meter reader to reduce daily workload. The elimination of most manual processes and encapsulations facilitates the easier and more accurate collection of meter readings, which must be communicated to the relevant controllers. The proposed system has undergone comprehensive testing and analysis, confirming its effective and precise performance, thereby allowing the power board to provide satisfactory service to its clients by resolving existing issues with this solution. This concept offers multiple benefits; nonetheless, it constitutes a "one-time investment" approach.

Applications :

- The Real-time Power monitoring at houses.
- Sensing the power-pilferage, at the exact- location.
- Transmitting the information, over wireless, to substations.
- It can be used in domestic-households.
- It can be implemented in malls, where huge amounts-of power are wasted.
- It can also be implemented in, schools and colleges.
- The system can be incorporated for almost all- the-types of users.
- The concept is well suited. especially for villages and interior-areas.

Conclusion:

Electricity theft, or pilferage, incurs business losses through the manipulation of energy meters to distort billing data or the creation of unauthorized connections to power lines. Assessing commercial losses by conventional power system analysis methods is impractical due to insufficient understanding of commercial and actual loads within the market system, hence making estimations of sustained losses inefficient. The efforts to ascertain commercial losses are deficient, as the data are extraneous in the documentation of identified incidents, rather than based on real measurements of the electrical power system. The adoption of the proposed technology may optimize electricity consumption.

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REFERENCES:

1. "Wireless Power Theft Monitoring And Controlling Unit for Substation" Saritha I G 1, Sowmyashree M S 2, Thejaswini S3, Surekha R Gondkar4 Department of Telecommunication Engineering, IOSR Journay of Electronics and Communication Engineering (IOSR-JECE) e-ISSN: 2278-2834,p- ISSN: 2278-8735.Volume 9, Issue 1, Ver. III (Jan. 2014), PP 10-14
2. "Wireless Power Theft Monitoring System Using Zigbee" Nanaware Sangram T, Nare Suraj P. Deshmukh Vishal K. Resincap International Journal of Science & Engineering Volume 1, Issue 5, Jume 2017.
3. "Wireless Power Theft Monitoring System Using Zigbee", VIKAS VERMA1, IRJET, Volume: 05 Issue: 12 Dec 2018
4. "Wireless Power Theft Monitoring System In Energy Meter", Aditi Komajwar1 , Drishty Singh2 , Mr. Mithilesh Singh3, (IJSR) ISSN (Online): 2319-7064 Index Copernicus Value (2013)
5. T.B. Smith, "Electricity theft- comparative analysis,"Energy Policy, vol. 32, pp. 2067–2076, Aug. 2003.
6. Bharath, P.; Ananth, N.; Vijetha, S.; Prakash, K.V.J.; "Wireless Automated Digital Energy Meter" in Sustainable Energy Technologies, ICSET 2008
7. Muhammad Ali Mazidi and Janice Gillespe, "The 8051 Microcontroller and Embedded Systems"