

# **Energy-efficient solar-powered communication system for oil pipeline monitoring**





## Overview

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This study introduces an innovative hybrid energy harvester that combines solar and flow energy sources to power Internet of Things enabled pipeline monitoring systems. These solar-powered solutions provide reliable energy for sensors, communication. Solar-powered CCTV monitoring systems emerge as the ideal solution to ensure 24/7 protection in off-grid, remote, and high-risk environments.



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### **Solar-Powered Pipeline Monitoring: Siemens Solar's Oil**

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In 2020, Siemens Solar installed 50 solar-powered monitoring stations along a 500-mile pipeline in Saudi Arabia's Eastern Province. Each 10 kW

### **Energy-efficient routing protocol for reliable low-latency Internet of**

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In OGI monitoring, IoT devices are linearly deployed with no alternative communication mechanism available along OGI pipelines. Thus, the absence of both communication routes can disrupt crucial



## **Developing an IoT-Based System for Real-Time Monitoring and**

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The research into developing an IoT-based system for real-time monitoring and maintenance of energy and oil pipeline networks has provided significant insights into the potential of this technology to

## **An Analytical Framework for Optimizing the Renewable Energy**

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This paper presents an analytical and experimental framework for designing energy-efficient, self-sustaining pipeline monitoring systems that leverage renewable energy harvesting and low-power

## **An energy-aware and Q-learning-based area coverage for oil pipeline**

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In this paper, we propose a reinforcement learning-based area coverage technique called CoWSN to intelligently monitor oil and gas pipelines.

## **Solar-powered CCTV deployment in remote oil pipeline site**

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Every project teaches us something new. This solar-powered CCTV deployment in a remote oil pipeline site reminded me how vital reliable energy is to data integrity and safety.

## **International Journal of Applied Power Engineering (IJAPE)**

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This paper introduces a remote system monitoring approach for an efficient solar-powered pump designed as a solution for abandoned oil and gas well. The proposed method utilizes LoRa



## **Solar-powered Surveillance Systems for Oil Pipeline**

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Deploy off-grid solar-powered surveillance systems for oil pipeline protection. Discover hybrid solar-wind kits, PTZ cameras, and OEM-ready monitoring

## **Upgrading Sustainable Pipeline Monitoring with**

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The findings underscore the ability of piezoelectric power harvesting structures to revolutionize pipeline monitoring, supplying a sustainable and self

## **Review of energy harvesting techniques in wireless sensor-based**

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In this paper, we provided a comprehensive review of WSN-based energy harvesting (EH) technologies geared for pipeline monitoring systems in important applications pertaining mainly to

## **A wireless sensor network based pipeline monitoring system**

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A performance metric based comparative analysis of the experimental protocols is presented giving rise to a high performance and energy efficient Cross-Layered Protocol Stack. This

## **An Analytical Framework for Optimizing the Renewable**

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This paper presents an analytical and experimental framework for designing energy-efficient, self-sustaining pipeline monitoring systems that



## **Enhancing Security and Efficiency in IoT-Based Oil**

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This study presents a novel framework for IoT-based oil and gas pipeline monitoring, designed to bolster security, data accuracy, and operational

## **(PDF) Energy-efficient routing protocol for reliable low-latency**

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In pipeline integrity management, the Internet of Things (IoT) has revolutionized the area by providing innovative methods for monitoring, maintenance, and operating efficiency.

## **A Hybrid Flow Energy Harvester to Power an IoT-Based**

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This study presents a novel energy harvesting device that combines piezoelectric and electromagnetic transduction to extract energy from fluid flow

## **Energy-efficient routing protocol for reliable low-latency Internet of**

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The energy model and congestion control mechanism optimize data packets for an energy-efficient and congestion-free network. In PO-IMRP, nodes are aware of their energy status and communicate

## **A Theoretical Approach to Optimize the Pipeline Data Communication**

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Overall, data communication and transmission are critical for the oil and gas industry's goals of increasing production efficiency and enhancing safety. This work provides a brief overview of



## **Developing an IoT-Based System for Real-Time Monitoring and**

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Adopting an IoT-based system for pipeline monitoring and maintenance offers a range of significant benefits that can drastically improve operational efficiency, enhance safety, and reduce overall

## **Real-time monitoring and data acquisition using LoRa**

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This study proposes a wireless communication-based approach that allows for data acquisition and system monitoring of the entire solar system of a

## **Upgrading Sustainable Pipeline Monitoring with**

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This study presents the design and implementation of a piezoelectric power harvesting device to capture vibrational energy from pipelines to self

## **An efficient oil and gas pipeline monitoring systems**

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Request PDF , An efficient oil and gas pipeline monitoring systems based on wireless sensor networks , Wireless sensor networks (WSN) is considered an effective technique to collect oil

## **A wireless sensor network based pipeline monitoring system**

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This paper proposes a Pipeline Monitoring system using the technology of Wireless Sensor Networks. This research involves the development of a Remote Condition Based Monitoring application for Oil



## **An integrated fluid flow and solar hybrid energy**

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This study presents a novel hybrid solar and flow energy harvesters (FEHs) designed to power IoT-based wireless sensor systems for digitizing and

## **Zigbee and Long-Range Architecture Based Monitoring**

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The Internet of Things (IoT) provides an opportunity for realizing the real-time monitoring system by deploying the IoT-enabled end devices on the oil

## **Modeling the Performance of a Multi-Hop LoRaWAN**

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Scenarios of oil pipeline monitoring systems in Saudi Arabia are specified for studying



the proposed multi-hop system's performance. The

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