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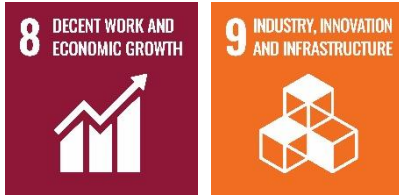
SUSTAINABLE
DEVELOPMENT
GOALS



Scaling Up Scientific Metrology in Saudi Arabia

NMCC has delivered SI-traceable calibration services, technical consultations, and provided training to regional institutes across five physical metrology areas to drive industrial innovation and economic diversification

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The Challenge

Saudi Arabia is heavily diversifying its economy. Previously, local industries relied on costly cross-border calibration, delaying innovation. Establishing robust, internationally recognized national measurement standards is crucial for empowering sustainable industrial development, advancing sustainable economic growth, and fostering resilient industrial innovation.

The Solution

The National Measurement and Calibration Center (NMCC) rapidly scaled its industrial metrology services, ensuring strict traceability to the SI under the CIPM MRA. To guarantee global competence, NMCC participated in 118 international interlaboratory comparisons. Furthermore, NMCC secured national accreditation for its entire portfolio of 417 services. This strategic intervention provided local industries with reliable, internationally recognized calibration services domestically, directly supporting sustainable industrialization.

NMCC's accredited services cover the full spectrum of physical and chemical metrology: mass and related quantities (force, pressure, density, hardness), dimensional metrology, temperature and humidity, electricity and magnetism (DC/AC voltage, current and power, high voltage, impedance, RF and electromagnetic fields), time and frequency, photometry and radiometry, acoustics and vibration, and chemical metrology including Certified Reference Materials (CRMs). These services underpin the Kingdom's eight priority industrial sectors: chemicals, metals, mechanical and equipment, building materials, renewables, automotive, aerospace, and maritime. Before we localized these capabilities, this demand went largely unmet at home.

Before the metrological intervention, there were too few independent calibration laboratories to serve the Kingdom's instruments, and the conformity services manufacturers needed to prove compliance with foreign standards were either unavailable domestically or available only at high cost — a direct drag on export competitiveness. Manufacturers routinely shipped precision instruments abroad for SI-traceable calibration, accepting weeks of downtime, transport risks to delicate equipment, and foreign-currency costs for what is now a domestic, single-day service. Since 2015, the process has been ongoing, with additional services being added at present. NMCC has executed this scale-up on the foundations laid by its establishment in 1986 and its signature of the CIPM MRA in 2011. The acceleration is evident in our published CMCs, which rose by over 40 % (from 61 to 87), and in the recognition of the Kingdom's first Designated Institute for ionizing radiation in September 2023.

A Quantifiable Impact

The intervention dramatically enhanced industrial capabilities and institutional resilience by localizing 417 calibration services, eliminating overseas shipping, and slashing downtime from weeks to days. NMCC has also fortified scientific infrastructure by producing 11 CRMs and hosting over 150 laboratories in Proficiency Testing (PT) programs. The efforts are both specific and broad: calibration services benefit individual clients, whereas the development of metrological infrastructure strengthens the national measurement system itself. NMCC resides at the apex of the Kingdom's metrological traceability chain, anchoring the reference standards from which most public and private laboratories derive their measurements.

A significant increase in demand for calibration services led to NMCC's calibration certificates surging nearly 3-fold (1 769 to 5 267). Concurrently, NMCC cultivated local talent by delivering over 500 training hours to over 250 metrology and technical trainees across 35 programs. NMCC has also provided 20 technical consultations to clients across our priority sectors, principally government and private laboratories. NMCC's capacity-building role also extends regionally: metrology training has been recently delivered to the national metrology institutes of Kuwait, Bahrain, Oman, and Sudan.

Furthermore, NMCC also published 87 CMCs in the BIPM KCDB, ensuring that Saudi measurements are internationally recognized, reducing technical barriers related to measurement acceptance and conformity assessment, and empowering local manufacturers to export globally. Our 87 published CMCs fall into four broad areas: electrical metrology (35 in the subareas of AC/DC voltage, current and power, high voltage, impedance, RF, and electromagnetic fields), mass and related quantities (18 in the subareas of mass, force, pressure, density, hardness, gravity), dimensional metrology and thermometry (23), and time and frequency (11, including laser frequencies).

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