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How fi spot unusual monthly gas use inna Trinidad an Tobago wid di closest-match method

A test weh use four gas-consuming sector an no incident label

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Wa di study find

Wi compare monthly gas use inna 2024 wid twelve reference month from 2023. Di closest-match method flag April, June an July. June pass di reference cutoff even when wi leave out each sector one at a time. A test weh use only di national total flag August an October too, but miss April. Di result dem point to record weh need checking. Di bulletin dem nuh label actual incident, so wi cyaan measure how accurate di detection was [1, 2].

Weh di risorch a aks?

Di four-sector test pick di same month fi check as di test weh use only total gas use fi di whole country?

Data an metad

From Table 3B inna di revised energy bulletin dem fi 2023 an 2024, wi tek gas use fi electricity, ammonia, methanol an liquefied natural gas (LNG), plus di national total. Each reading give di average daily rate fi one month, inna million standard cubic feet per day [1, 2].

Fi each pair a month, wi divide di difference fi each sector by dat sector own 2023 sample standard deviation. Wi square di answer dem, add dem up an tek di square root. Each 2024 month get a score equal to di smallest distance from it to any 2023 month. Dat a di one-nearest-neighbour way fi score how unusual a reading is [3]. Fi set di cutoff, wi find each 2023 month closest odda month inna 2023. Wi tek di largest a dem twelve distance. Only a score weh higher than di cutoff trigger a check.

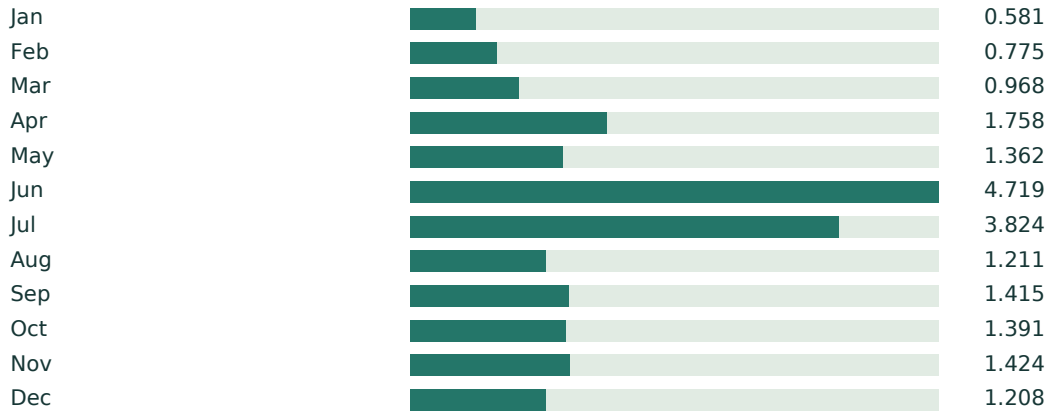
Rizolt dem

Di four-sector cutoff come to 1.703. April score 1.758, June 4.719 an July 3.824. Di closest match fi June a August 2023. Inna June 2024 gas use fi ammonia was 294 million standard cubic feet per day, an fi methanol it was 409. Both a dem lower than dem 2023 monthly minimum, 359 an 483 inna di same order [1, 2].

When wi run di same calculation wid only di national total, it flag June, July, August an October. When wi leave out LNG an run di test pon di odda three sector dem, only June pass di cutoff. June clear di new cutoff inna all four test weh leave out one sector.

Distance from each 2024 month to di closest 2023 month

Standardised distance



Di higher di score, di less familiar di mix across sector. Di four-sector cutoff was 1.703. Di score nuh have a unit. Wi calculate it from [1, 2].

Wa di rizolt mean

Somebody checking April woulda see a mix across sector weh nuh common, even though di national total a 2,364 fall inside di 2023 range a 2,331–2,665 [1, 2]. Di score tell yuh which record fi compare. Yuh woulda need plant log an reporting note fi explain why two month differ.

Limit a di study

One reference year cyaan cover every season an industrial condition weh coulda come up. Di revised bulletin dem look back pon what done happen. Di method nuh have information bout planned shutdown, reporting mistake or confirmed interruption. A flag cyaan tell yuh di chance a one outage or how much it woulda cost fi miss a incident.

Run di analysis agen

Read di 24 row dem inna date order. All five volume column show di average daily rate fi dat month inna million standard cubic feet per day.

Use di four sector column fi work out di 2023 sample standard deviation dem. Divide by 11 when yuh a calculate di variance. Keep dem same scale fi di reference distance an di test distance dem.

Fi each reference month, tek out di month itself before yuh look fi di closest match. Use di largest a di twelve distance fi di cutoff. Compare each 2024 month wid all twelve reference month.

Do it again wid only di national total. Fi check how much each sector matter, leave out one at a time an work out di cutoff an di 2024 score dem again.

Data tiebl

Month	Electricity	Ammonia	Methanol	LNG	National total
2023-01	247	462	569	1264	2665
2023-02	239	454	569	1265	2638
2023-03	251	427	488	1273	2537
2023-04	253	409	483	1190	2419
2023-05	264	419	517	1230	2529
2023-06	271	464	534	1118	2501
2023-07	293	418	548	1094	2461
2023-08	270	377	523	1058	2331
2023-09	290	438	559	1178	2527
2023-10	261	374	576	1082	2342
2023-11	260	359	592	1180	2488
2023-12	249	408	590	1074	2415
2024-01	256	414	496	1158	2431
2024-02	254	480	558	1284	2686
2024-03	265	450	536	1182	2540
2024-04	266	448	557	994	2364
2024-05	290	443	506	1087	2430
2024-06	265	294	409	848	1905
2024-07	284	445	530	800	2161
2024-08	274	478	572	1155	2586
2024-09	275	480	544	1015	2388
2024-10	272	449	484	1261	2566
2024-11	275	452	487	1220	2536
2024-12	247	438	512	1184	2474

Suos dem

[1] Ministry of Energy and Energy Industries, Consolidated Monthly Bulletins, January–December 2023, Table 3B, amended 28 November 2025

[2] Ministry of Energy and Energy Industries, Consolidated Monthly Bulletins, January–December 2024, Table 3B, amended 28 November 2025

[3] S. Ramaswamy, R. Rastogi and K. Shim (2000), Efficient algorithms for mining outliers from large data sets

Weh di data come fram

Ministry of Energy and Energy Industries, Table 3B, 2023 and 2024 bulletins, amended 28 November 2025. CAIA calculations.