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How fi forecast how much renewable electricity Barbados produce each year

Three forecast methods test pon five year weh done pass

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Wa di study find

Barbados record 44.1 gigawatt-hour (GWh) a renewable electricity inna 2018 an 108.4 GWh inna 2022 [1]. Wi test three way fi work out next year total wid only di earlier year dem. Add di average yearly increase to di last figure give di smallest average absolute error, 6.28 GWh. When wi fit a straight line, di average miss come to 7.89 GWh. A planner can test a new model pon di same year dem an compare it wid dem two figure deh.

Weh di risorch a aks?

Which simple model come closest to di next year total from 2018 to 2022?

Data an metad

Wi tek di renewable electricity figure dem from Chart 4 inna di Barbados Energy Bulletin [1]. Wi divide kilowatt-hour by one million fi get GWh, den round to one decimal place before wi fit di model dem. Di ten figure dem run from 2013 to 2022. Wi start wid di first five year fi train di model dem.

Fi each year wi a predict, di persistence rule use di last reading again. Di drift rule add di average yearly change since 2013 to di last reading. Linear regression use least squares fi find di slope an di height weh a straight line cross di vertical axis, using all di earlier year dem. After each forecast, wi add di year weh wi just observe to di training set. Fi work out di average, each a di five absolute error dem count di same [2].

Rizolt dem

Persistence miss by 14.14 GWh pon average. Drift bring di average miss down to 6.28 GWh. Regression come closest inna 2018 an 2019, but fi 2022 it come in 20.67 GWh too low. Drift come in too low fi 2022 too, by 13.89 GWh.

When wi leave out di last test year, di order stay di same. From 2018 to 2021 di average miss come to 4.38 GWh fi drift, 4.70 GWh fi regression an 11.73 GWh fi persistence, rounded to two decimal place.

How far a one-year forecast miss pon average



Di average absolute error cover di five year from 2018 to 2022. A smaller figure mean di forecast land closer. Wi calculate di figure dem from [1].

Wa di rizolt mean

Di early reading dem still have weight when yuh fit a straight line. Drift start from di most recent output an add di average increase from di past. Dat difference matter when generation climb near di end a di series. Anodda test could add di capacity weh due fi come into service, using only what di planner coulda know when each forecast due.

Limit a di study

Di training period dem share some a di same year. Di five error dem cyaan tell wi how accurate di method dem a go be inna di future. Dis historical edition a di bulletin coulda revise some earlier figure. Di yearly total mix renewable source an hide how output change hour by hour. Dem result yah cyaan guide which plant fi send power to di grid or tell how well a solar weather model work.

Run di analysis agen

Put di ten yearly figure dem inna order. Fi forecast 2018, train wid 2013–2017. Add one year fi each next forecast.

Fi drift, tek di first figure from di last one. Divide by di number a training year minus one. Add di answer to di last figure. Fi regression, fit a line through output against year an predict di next point.

Tek each forecast from di actual reading. Use di size a di difference widout di plus or minus sign, den average it across di five year. Keep all di decimal place till yuh a report di answer.

Data tiebl

Year	Renewable output (GWh)
2013	5.3
2014	4.7
2015	16.8
2016	26.5
2017	37.7
2018	44.1
2019	52.5
2020	68.7
2021	84.6
2022	108.4

Suos dem

[1] Barbados Energy Bulletin, Volume 8, Issue 2, January–December 2022, Chart 4, p. 14

[2] R. J. Hyndman and G. Athanasopoulos, Forecasting: Principles and Practice, 3rd ed., Chapter 5