

Commuter Forecasts to support active travel

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Why commute forecasts?

Why?

- Demand from users
- Support mode shift
 - How many 'marginal journeys' can we keep in active modes by providing great forecasts?
 - ... and avoid unsafe journeys



Image credit: Kristofer Trolle



Analysis: impacts of weather on cycling in Wellington

- Analysed Wellington cycle tracker data 2018-21 against:
- Total hourly rain accumulation (but ANY rain was correlated with large decrease in tracked cyclists)
- Median hourly wind direction
- Maximum Wind Gust
- Average Air Temperature

Average wind speed was also analysed and showed similar trends to max wind gust.

	Morning	Evening
Rain (yes)	-28%	-29%
Max Wind Gust (per Knot)	-1.2%	-1.3%
Southerly (yes)	-4.0%	-8.1%
School Holiday (yes)	-12.7%	1.9%
Avg Air T (per Deg)	0.6%	1.0%



User research

Impactful weather during commutes

%	Bicycle	Car	Public Transport	Walking/running	Motorcycle
Rain or Snow	82	63	52	80	82
Consistent Wind (high mean speed)	63	19	35	39	54
Strong Gusts	63	21	18	36	75
Cold Temperatures	20	10	19	36	32
Hot Temperatures	14	5	15	36	14
Fog/Low cloud	10	21	5	1	32
Ice or standing water	30	18	11	21	43
High UV	6	1	2	21	0
High Pollen Levels	3	1	1	8	0
High Humidity	12	2	7	26	0
None	4	15	31	11	4
Other	2	2	1	0	0

In March 2022, MetService surveyed 587 users of metservice.com and can.org.nz (Cycle action network) to better understand the impact of weather to their behavior when it came to commuting.

Participants were grouped into cyclists, public transport, motorists, walking or running and motorcyclists.



User research

How users check the forecast for their commute

%	Bicycle	Car	Public Transport	Walking/running	Motorcycle
I look at hourly forecast data for my local area	38	36	57	61	45
I look at the written weather forecast or icons for my local area	24	40	42	48	45
I look at recent observations (including radar) for one or more location	26	35	35	43	64
I look at weather maps	20	34	30	32	36
I look at multiple websites or sources and compare them	12	27	17	21	9
I look at the weather for my start point and destination	10	17	16	16	0



User research

- Agreement that rain and wind were impactful, but wide divergence in threshold required to change commute (from 20km/h-100km/h sustained wind speed)
 - Some variance likely reflects commuters' personal comfort levels
 - Some variance likely reflects differing understandings of available data: is 30km/h sustained wind speed "a lot" or "a little"? What about gusts?

"If the wind gusts at Kelburn and Wellington Airport are over 70 km/hr, biking becomes very challenging. If the gusts are exceeding 80 km/hr biking becomes dangerous (e.g. hard to maintain a straight line when riding). Over 90 km/hr and it is a no-go for me - at those points in the past I have been blown off my bike, and blown to a standstill. If the intensity of rain is light (e.g.

"gusts over 80kph or heavy rain I drive"

"If it's blowing over 40 knots I don't ride, dangerous gusts. High tide and hi

"If it's heavy rain or average wind speed > 40 km/h I take the bus otherwise I cycle."

"If wind is over 30 kmh, or strong gusts then I will take the bus or drive"

"Wet & wind over 20 Km/h take car"

wind: Requires more effort Strong gusts: Be more careful, if winds are high enough to knock down trees (80km/hr? not sure) then will most likely walk or take public transit. I actually biked when Cyclone Dovi passed through Central Auckland with gusts reaching 130km/hr - it just felt extra windy, but not like I was going to fall over - but when I got home and heard of the trees falling and wind speeds I did slightly regret going out. I didn't see



Developing the commute forecast

- 1. Priority based rules, focused on the most impactful weather for the commute method.
- 2. Provide detailed data where relevant, but also provide **visual cues**/context of what weather is likely to be impactful.
- 3. Introducing new data sources, including hourly **gust forecast**.
- 4. (for Wellington) Metlink messages that vary by forecast and commute method.

Commute Forecast

	Transit	Cycling	Walking	Driving	
This morning:				This afternoon:	
6am		Cold 3°, don't forget gloves		3pm	Gusty, 22km/h SW, gusts 42km/h
7am		Pretty good		4pm	Pretty good
8am		Light rain		5pm	Pretty good
9am		Moderate rain		6pm	Very windy 45km/h N, gusts 19km/h

Brrr. Layer up for your commute, and don't forget gloves.

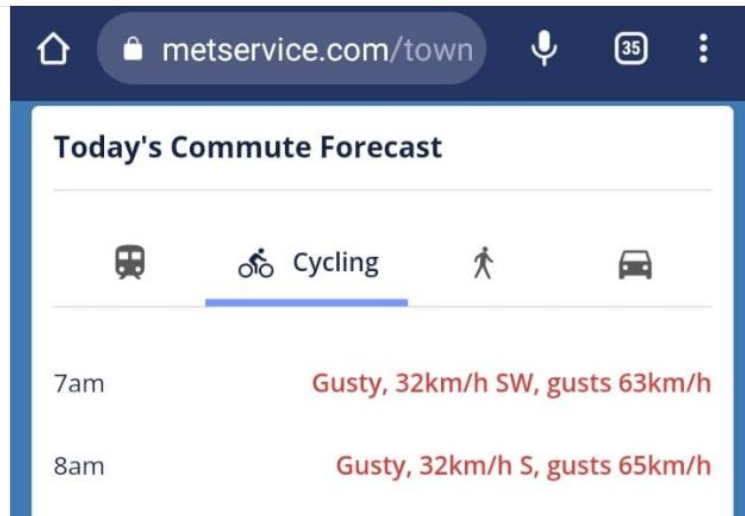
Plan ahead with metlink



Release & Reception

Cycle Wellington - cyclewellington.org.nz
July 26, 2023 · 🌐

Found this section on the metervice website today. For walking and PT it said bring a raincoat. Somebody's figured out that cyclists want to know wind gusts more than rain.



Updates since launch:

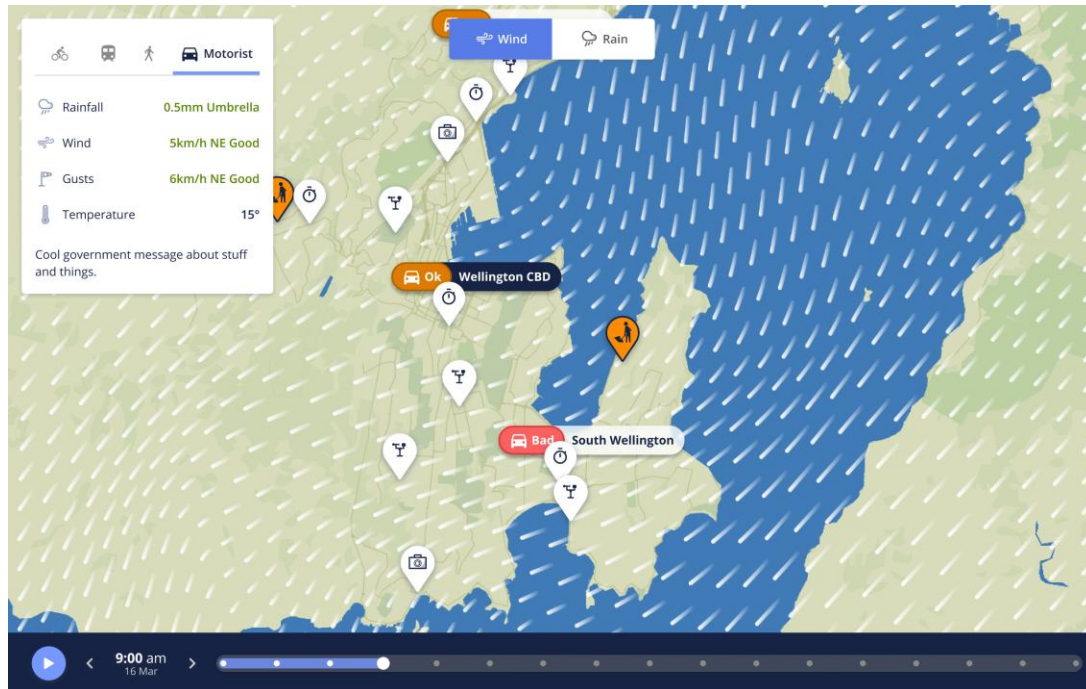
- Request to add **school dismissal time slots** so schools can display forecasts to encourage students to use active modes
- Added to app after many requests

Planned improvements:

- Improve sensitivity to **'waiting conditions'** for public transport.
- Formal evaluation planned after 12 months



Future improvements



Long term:

- Increase **forecast resolution**: visualise localised rain and wind
- Increase **forecast frequency** – 30 min timesteps
- Incorporate **real time observations and 'nowcasting'** from/near core cycle infrastructure
 - Many new roads include permanent observation infrastructure (in road sensors etc) – plan for this in major cycle infrastructure too
- Account for possible **weather related disruption** of public transit (eg wind related operational changes, access closures)



Thank you! 🌞