Dr Jurriaan Beek OAM
14th June, 2023

Dear Richmond Valley Manager, Mayor, and Councillors,

Thank you for this opportunity to make a submission concerning the Community Strategic Plan, Richmond Valley 2040.

I have been a general practitioner in this beautiful valley since 1980, before that I was a scientist working at BHP in Port Kembla and ACI in Sydney.

I wish to bring to your attention the fact that Waste to Energy incinerators (W2E) constitute a significant and unacceptable human health risk.

While you are keeping “an open mind” (Objective #9, Community Strategic Plan 2040) on the subject of these W2E incinerators let me suggest that reading the studies that can be easily found online would help you understand the threat that such an introduction to the Northern Rivers would constitute**.**

- According to USA EPA data, municipal waste is made up of approximately 22% Carbon. A Waste to Energy (W2E) Incinerator designed to incinerate 180,000 tons of municipal waste per year will be incinerating approximately 39,600 tons of carbon, assuming a similar carbon content as in the USA. Given that one ton of carbon on incineration yields 3.66 tons of carbon dioxide, then 39,600 tons of carbon will convert to 144,936 tons of carbon dioxide per year.

- We are told that a W2E Incinerator is capable of reducing the input municipal waste to between 15% to 25% ash. In other words, 180,000 tons of municipal waste could be reduced to between 27,000 and 45,000 tons of ash per year, or on average 36,000 tons

- In short, the W2E Incinerator has converted 180,000 tons of input municipal waste into on average 180,936 tons of output waste (i.e. weight of the ash plus the weight of the carbon dioxide gas produced). In effect we have created slightly more waste as a result of the incineration process.

- This is an approximate conservative estimate, as in reality the percentage carbon content could be much higher (or lower), depending on the sources and makeup of the municipal wastes.

  The production of this amount of waste runs contrary to the principle of the “circular economy which aims to design out waste so that we end up with less waste, fewer emissions, and less harm to the environment”, (Objective #9, Community Strategic Plan 2040).

- The incinerator chimney stack will release not only carbon dioxide (a potent greenhouse gas) but a veritable soup of toxic gas components such as dioxins, furans, oxides of nitrogen, carbon, sulphur and chlorine (that converts to hydrochloric acid on contact with water). This concoction goes up the chimney stack, and is released into the atmosphere, where prevailing winds will greatly facilitate the spread of the fallout over a wide area. These components are all inherently difficult to remove from the chimney emissions.

- The remaining ash will contain traces of: lead, chrome, arsenic, mercury, cadmium, silica, tin, lithium and beryllium to name but a few, as contaminants from all manner of batteries (nickel, cadmium, and lithium based), solar panels, fluorescent lights etc.

- The left over ash is made up of two components - an extremely fine (particulate) component collectively called fly ash, and a heavier component called bottom ash made up of small chunky bits. The shear quantities involved will create significant disposal problems.

  The fly ash will be blown up the chimney where most will be collected. Even with the best filtering systems in the world in place,

and barring any unforeseen technical breakdowns, a percentage of this fly ash will inevitably escape into the atmosphere. It is simply impossible to completely filter out all the fly ash due to its extremely small particulate size. On the other hand the trapped and filtered ash will create storage and disposal problems for which (not unlike radioactive waste) at present there are no tested, safe, and community acceptable solutions.

The chimney stack gasses contain:

1. *Dioxins and Furans*.
    - A family of toxic substances that share a similar chemical structure. These are some of the inevitable chemical by-products produced by high temperature incineration of organic and plastic materials typically encountered in W2E incineration.
    - Dioxins enter people via the food chain, water supply, and the air we breathe.
    - Dioxins are fat soluble and accumulate in fatty tissues.
    - 80 % of human exposure comes from contaminated food.
    - Dioxins have been isolated from the soils, plants and the food that is grown on those soils downwind from incinerator plants.
    - Grass eating animals, constitute an important pathway to human dioxin exposure as a result of consuming cow's milk, dairy products, meat etc.
    - There will be an accumulation of toxins in the soil and local water which will be absorbed by, and contaminate, home-grown produce, eggs, honey and meat from the predominately rural properties in our locality.
    - Rainwater harvested from roofs as drinking water will be contaminated by air pollution emissions and toxins settling on roofs and washing into water tanks.

2. Included in the chimney emissions are various oxides of nitrogen and sulphur, as well as chlorine which become acidic aerosols (acid rain) that on foggy cold mornings behaves like an acidified mist that is lung toxic.

3. As mentioned, the chimney stack will inevitably emit particulate matter smaller than 10 microns. These are the particles that over time will result in disabling respiratory diseases similar to that seen in coal miners, tunnel workers, and more recently, in Caesar Stone workers.

4. As mentioned, the chimney will emit some 144,936 tons of carbon dioxide per year, a potent greenhouse gas that will contribute to climate change.

2. The left -over Ash:

- Broadly speaking waste incineration produces two types of ash: bottom ash and fly ash. The heavier bottom ash settles on the incinerator floor. A proportion of the lighter fly ash, as already mentioned, will inevitably escape through the facility's smokestacks, in spite of complicated and sophisticated particulate filters.

- While both types of incinerator ash are hazardous, fly ash is particularly dangerous, not only because it contains a high concentration of toxic compounds, but more so due to its small particle size, once inhaled stays permanently within the confines of the human lung where over time, like asbestosis, silicosis and pneumoconiosis (coal miner's lung) irreversible damage will result. In fact this will most likely present as a future occupational hazard to those who are employed at the W2E plant with possible employer medico legal implications.

- Contaminants like dioxins, heavy metals such as lead, mercury, cadmium, lithium, and arsenic etc., are collectively called "forever chemicals", because they virtually never break down and are cumulative poisonous compounds, especially injurious to young children due to their rapid growing.

- Ultimately both ash types have to be disposed of. Suggestions that it be used as road fill will merely create road leachate spreading the toxic waste to adjacent grass lands. Burying this ash similarly leads to long term leachate leaks involving underground water table pollution. Overseas experience has shown that these “forever chemicals” inevitably end up as part of our food chain.

  Far better not to incinerate waste so as not to release the component toxic agents, that are best kept safely sequestered. A better option would be to manage our waste near where the waste was created as is currently the case, than acting as some sort of regional collection centre thus creating an unmanageable massive industrial disposal nightmare.

  Years ago, local government wisely banned the use of backyard incinerators because of municipal health concerns.

- Scientists are currently developing new strains of bacteria and fungi that destroy most plastic varieties.

- Better still we should be doing our collective best to minimise activities that leave a large footprint of waste.

Medical effects of the incinerator discharges:

- Dioxins and furans are cancer causing substances.
- Higher rates of various cancers: of lung, oesophageal, and laryngeal.
- Problems with reproduction and fertility: reduced sperm counts.
- Skin diseases, especially in those employed at the incinerator site.
- Congenital malformation, cleft palate, spina bifida etc.
- Impaired immune system and kidney function.
- Liver impairment because of fatty liver disease, cholesterol issues.
- Increased risk of heart disease.
- Learning and development problems in children
- The acidic aerosols released on foggy cold mornings behave like an acidified mist that increase the risk of asthma, lung damage, and bronchiectasis.

- Particulate matter smaller than 10 microns remain lodged within the lung. Years later these cause irreversible lung changes as found in coal miners, tunnel workers, and more recently Caesar stone workers. Interestingly moves are afoot to ban the use of Caesar stone in NSW.
- Also included in the chimney stack gases are oxides of sulphur and nitrogen that are lung toxic.
- The emitted carbon monoxide and carbon dioxide, are both potent greenhouse gasses that will contribute to climate change and have serious health effects.
- Lastly, one may well consider the effects that incinerators have on a community's collective mental health, when those living near such a site begin to realise the impact on their health and their property values.

Studies in support of the adverse incinerator medical outcomes

1 Studies in Japan in 1992 have revealed a relation between respiratory medications prescribed and the distance from the incinerator, confirming that children living near incinerators had significantly reduced lung function capacities.

2 Lausanne the 4th largest city in, Switzerland had much of its soil polluted with dioxin, as the result of the local waste incinerator emitting dioxins. It was closed in 2005. In 2021 soil testing confirmed continuing dioxin pollution.

3 2018 in the Netherland one of the biggest, state of the art waste incinerators frequently exceeded EU safety limits.

In Summary Why Are Waste Incinerators Harmful to Health?

- They produce highly toxic waste gases that are well documented carcinogens and are known to create health problems that persist in the environment for decades.

- They produce ash which contains highly toxic heavy metals that especially affect the unborn and the very young, and are extremely difficult to dispose of safely.

- Experience world-wide has demonstrated that even the most modern industrial sized W2E disposal units from time to time are subject breakdowns with disastrous consequences.

- The ACT government has banned all W2E plants.

- Seemingly the NSW Government's approach to W2E is not to ban them, but to transfer the known hazards to less densely populated regions in an attempt to subject fewer people to the hazards rather than poisoning the many people in metropolitan and urban areas.

Finally waste incinerators constitute a significant and unacceptable human health risk to any community and I urge you to never put one in the Richmond Valley.

Yours faithfully,

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