World Central Kitchen (WCK), (www.wck.org), approached the WLPGA (www.wlpga.org) in February 2021 for support in developing what will probably be the world’s largest deployable cookstove operating on LPG.

Founded in 2010 by chef José Andrés, WCK uses the power of food to nourish communities and strengthen economies in times of crisis and beyond. WCK has created a new model for disaster response through its work helping devastated communities recover and establish resilient food systems. Based in Washington DC, WCK is an observer member of the WLPGA.
Past cooperation between WCK and the WLPGA has led to a WLPGA Good Industry Practice Guide document being published in 2018 supporting the conversion of dirty traditional cooking fuels - such as wood, charcoal, and kerosene - to LPG for kitchens in institutions such as schools, orphanages, hospitals and other public buildings (BEST PRACTICE IN LPG CYLINDER MANAGEMENT (wlpga.org)).

This Guide has been used to influence country governments on policies, regulatory standards, business practices and safety requirements that are necessary to promote safer, affordable and environmentally sustainable cooking with LPG in institutional kitchens.

The Guide is also used to educate key local decision makers on the health and environmental dangers associated with the use of dirty traditional fuels for cooking, and to illustrate the benefits of switching to LPG.

A training package is included in the Guide to support the education of children on the health, social, economic and environmental benefits of using LPG versus dirty traditional fuels for cooking.

WCK provided a section in the Guide on food safety, nutrition and sanitation with José Andrés saying: ‘When people use clean cooking fuels instead of firewood or charcoal, they are saving their lives, saving their forests, and saving their farming and fishing industries’.

The WLPGA partners with WCK in support of its Cooking For Life programme. Cooking For Life (Cooking For Life - WLPGA) is a campaign by the WLPGA that aims to facilitate the transition of one billion people from cooking with traditional fuels, as well as other dirty and dangerous fuels, to cleaner-burning LPG by 2030.

The unique benefits of LPG mean that it can be transported, stored and used virtually anywhere and this exceptional energy offers swift solutions in times of emergency (Disaster-Recovery-Generic-2015-FINAL.pdf (wlpga.org)).

An example of how the WCK and WLPGA partnership operates was when both organisations mobilised in 2018 after a 7.5 strong earthquake, followed by a Tsunami, hit Palu, the provincial capital of Sulawesi in Indonesia. The combined effect claimed over 2,100 lives making it the deadliest earthquake that year. Nearly 200,000 were severely impacted with over 10,000 injured.

WCK were already on the ground in Indonesia continuing to support communities in Lombok impacted by the earthquake that had occurred just a few weeks earlier. Despite difficulties with access, because of damaged airports and roads, the WCK team arrived in Pula shortly after the tsunami hit. They were the first international NGO on the ground and prepared thousands of meals for victims and first responders within hours of arriving on site.

Over the following weeks the WCK team provided hundreds of thousands of meals to over 44 locations.

Pertamina (www.pertamina.com) provided assistance to WCK to source LPG for the cooking effort in the disaster zone highlighting the importance of rapid engagement with WLPGA members on the ground.

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The on-site power plant at Margaritaville Vacation Club by Wyndham Resorts includes a 35,000-gallon LPG storage tank that provides enough fuel to sustain on-site power generation for fourteen consecutive days.

In February 2021 WCK contacted the WLPGA about their plan to build a field model for deployable kitchens to use when disasters, like the one in Indonesia, strike. They had realised that, because of the sheer scale of the disasters that they often faced, they needed something that scaled up their own capability to react.

With the long-term weather forecasts suggesting a very active hurricane season in 2021, WCK decided to have a large deployable kitchen ready and tested by mid-year. The concept had been tested in the Bahamas in 2020 during hurricanes Eta and Iota.

The Deployable Kitchen Project

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The deployable kitchen had to be capable of creating 10,000 meals per day and was to include giant LPG cookstoves that could be assembled and dismantled easily. All components of the deployable domed kitchen had to be packed into crates no larger than the size of a commercial US pallet (1.2m x 1.0m).

WCK contacted the WLPGA for support with the design and construction of the giant cookstoves which had to operate in every corner of the globe.

The Task

The plan was to design and construct a rapidly deployable kitchen with cookstoves, capable of creating 10,000 meals per day, that would safely and efficiently engage with an LPG supply source in any country where it might be deployed.

Key features were the need for everything to be conveniently packed in pallet sized crates that could fit into an aeroplane or boat, easily assembled and dismantled without the need for special tools or heavy equipment, and robust. Selection of the type of material used was critical.

The kitchen and cookstoves would be designed to be despatched from the US by air together with the WCK team. There could also be a need for small LPG generators for power. The LPG available in the disaster area would likely be supplied in 90lb (45kg) industrial/commercial cylinders which are generally fitted with POL valves.

However, sometimes the only immediate LPG supplies available in country are small domestic cylinders where the valve design maybe different to the US QCC type, so the unit would need to include adaptors to allow these cylinders to connect with the cookstove.

The cookstove design would need to address compatibility with cylinder banks and manifolds. There would also be a need to cover emergency procedures and firefighting equipment.

Immediate challenges for the team when they arrive at the disaster zone are to understand where the affected population is located – are they spread out or concentrated – in order to identify the best location for the kitchen. Often partnering with local restaurants/restaurateurs provides information on sourcing food, ingredients and LPG. Sourcing food locally through grocery stores and merchants helps to restart the local economy.

A team was mobilised and work commenced in March 2021 on finalising the design of the kitchen and giant cookstove. By April a prototype was in operation.
The Team

Sam Bloch, Director of Emergency Response, and Christina Espinosa, Director of Clean Cooking, headed up the WCK team responsible for the rapidly deployable kitchen project. They contacted WLPGA Directors David Tyler and Michael Kelly for support from the association and its membership.

The WLPGA contacted two members in the USA who are also based in Washington DC, the Propane Education and Research Centre (PERC) and the National Propane Gas Association (NPGA). Both organisations were keen to help. Within days a small team had been formed.

Steve Kaminski, President and CEO at the NPGA, recommended Bruce Swieciki, Senior Technical Advisor on Regulatory and Technical Services, to be the focal point from NPGA. Bruce contacted Matt Geller, who heads up the US National Food Truck Association, for ideas on designers of this unique challenge. One of them was Richard Gomez from AA Cater Truck who was on a food truck NFPA58 task force.

PERC are very familiar with WCK. Tucker Perkins, President and CEO of PERC, commented ‘...I am very familiar with the organisation and with mobile kitchens. We know WCT pretty well and even had them as a guest on the podcast Path to Zero (The Path to Zero | Propane.com). We have been working with food truck users and a few potential OEMs for some time, so this is a timely request and I am glad to assist with the WCK project...’

It was the first time Thompson Gas had been involved in a project of this type. Thompson Gas (http://www.thompsongas.com) is the sixth largest LPG company in the USA. It is a privately owned company, which has been in operation for 75 years, with locations from coast to coast. The input from Thompson Gas ensured the huge paella pans had sufficient heat from the LPG burners.

The experience from the trial in the Bahamas provided some good feedback into the final design. The dome kitchen structure, where up to five of the large cookstoves will be in operation, had to be well ventilated for both the people inside and the appliances.
The Cookstove

Although the cookstove was to be almost two metres in diameter it had to be constructed, like the rest of the kitchen, in such a manner so as to be packed in standard pallets. The other criteria for the cookstove were that it had be easily setup on arrival, and disassembled and packed away after use without the need for special tools.

Some of the design issues included ensuring the pipework was properly sized and safely routed, with the regulators balanced to achieve sufficient pressure to every burner head.

Once designed and constructed the work focused on setting up the regulators and burners to achieve a uniform flame configuration across the whole cookstove. Steve Foster said ‘...the main challenges were aligning the stove connections and careful routing of the pipework to enable everything to be packed correctly and safely for travel, and away from the cooks, during operation...’.

This case study highlights how the skills and cooperation of the propane (LPG) industry has helped WCK continue to step up their mission with this new cooking equipment, and also demonstrate how versatile propane is in a disaster situation.

A longer-term plan for the WLPGA and WCK is to create a global spreadsheet showing cylinders/valve types by country, together with key contacts for arranging the LPG supplies before the team arrives in a new disaster zone. Ensuring the team has the right connectors/adaptors for the LPG cylinders that are in country is a key issue and this is where coordination with the WLPGA membership can assist.

Acknowledgements

- AA Cater Truck
- Clean Cooking
- Emergency Response
- National Propane Gas Association (NPGA)
- Pertamina
- Propane Education and Research Centre (PERC)
- Thompson Gas
- US National Food Truck Association
- WLPGA
- World Central Kitchen

Images provided by WCK, Pertamina, Thompson Gas, PERC, WLPGA.