Buckeye Power Sales
Reliable Power Professionals Since 1947

Many generator system applications are a work in motion. Overtime the load, configuration and requirements of a power system for industrial and commercial applications can change. It could be the addition of a new hospital wing, expansion of a data center, an increase in the manufacturing capacity of a factory, or expansion of a commercial building. When an existing standby system is already in place, for cost and logistical reasons, there is usually a preference to build on the existing platform, rather than totally replacing it with a new system. A total Integrated Power System (IPS) supplier such as Kohler have designed their systems to be expanded as the application requirements change. This information discusses the advantages of working with an Integrated Power System supplier and how a facility manager or power system designer can expand their power requirements by easily building on an existing platform designed for expansion.

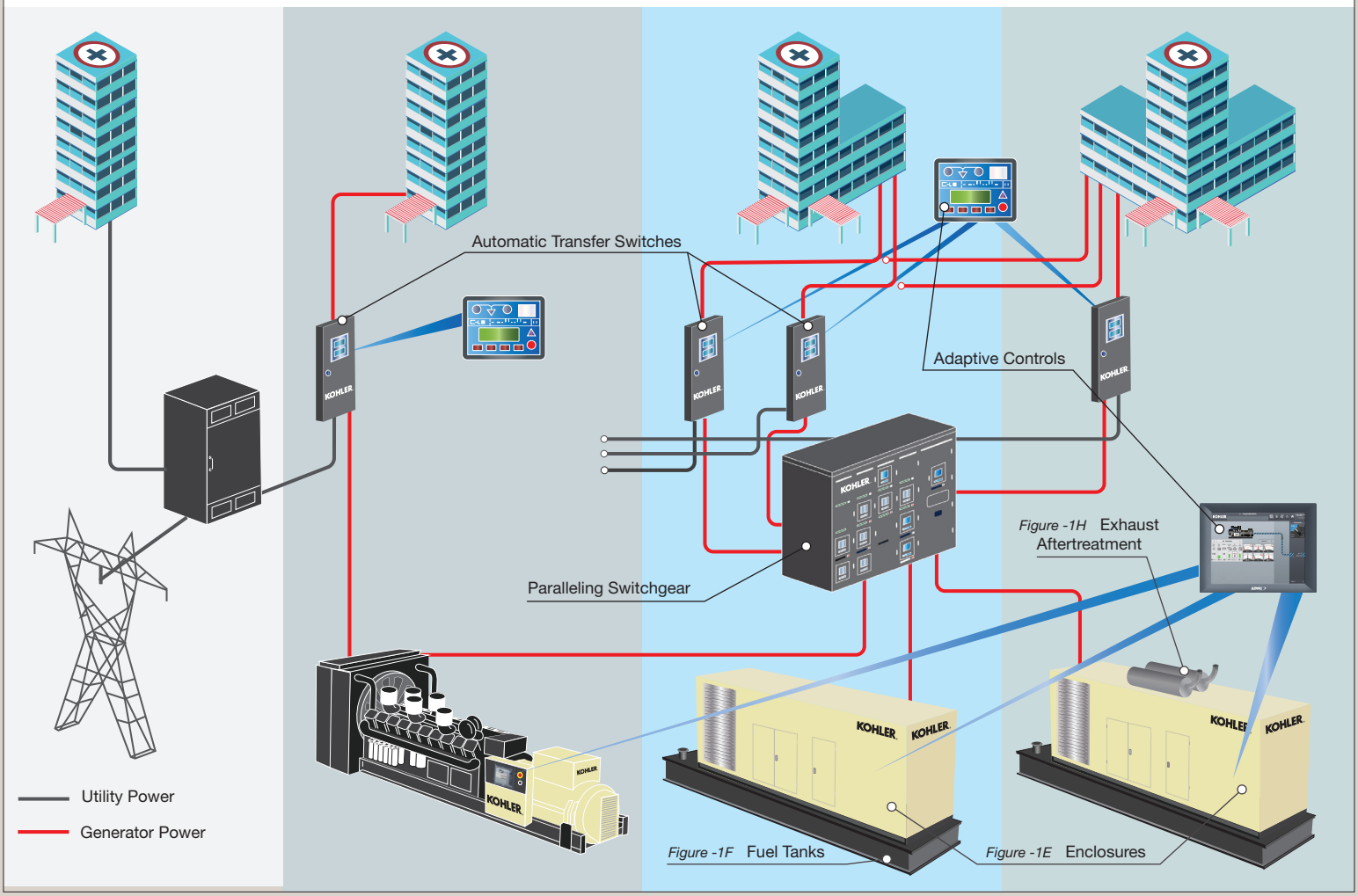
1.0 DEFINITION OF IPS:

An IPS range of generator sets are designed to have interchangeability and commonality of controls, switchgear, parts and modularized across a range of power nodes. The design philosophy provides users with the greatest flexibility to extend their power requirements as their needs change. Key components of total IPS system include:

1.1 MODULAR DESIGN PHILOSOPHY – A modular design gives generator system users the flexibility to expand their applications power requirements. The objective is to provide the lowest cost solution to expand and support future power needs.

Figure 1 **Expansion of a Facility and Addressing Changing Power Requirements with an Totally Integrated Power System**

Figure 1A - Phase One Utility Power Only	*Figure 1B* - Phase Two Standby Generator Applied	*Figure 1C* - Phase Three Second Generator Paralleled	*Figure 1D* - Phase Four Third Generator Paralleled



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1.0 DEFINITION OF IPS (CONTINUED):

1.2 COMMON ENGINE PLATFORM – For a given range of power nodes, the engine platform selected was designed to cover a wide range of power by the addition of cylinders of equal bore and stroke. The Kohler KD series is an example of an engine platform developed for a wide range of generator power nodes. This provides commonality of key engine components for service experience and provisioning of parts. Commonality is not just the mechanical engine components but also electric components, including starters and sensors and fuel management.

1.3 GENERATOR END – The generator platform follows the same design philosophy. Mechanical components including flange adapters, foots and frames are designed to be interchangeable. The design philosophy is extended to the electrical components to ensure best economies of scale across different power nodes and ease of serviceability and parts. Connections and size only change as amperes generated increase.

1.4 EMISSION AFTERTREATMENT COMPONENTS – Exhaust systems across the engine platform are a modular design with the same basic connection dimensions using the addition of aftertreatment devices such as SCR as the engine power and cylinders increase. As emission standards change, the application has bolt-on solutions.

1.5 SWITCHGEAR – Paralleling switchgear gives the user the ability to parallel up to eight generators. An additional generator system based on the same platform is the most cost-effective and simplest engineering solution to provide an on-site increase in power requirements.

1.6 CONTROLS – Adaptive controls for generator start, stop and monitoring and Automatic Transfer Switches (ATS) are designed and constructed to follow the same format across a wide range of power nodes. Further adding to the bolt-on philosophy.

1.7 REMOTE MONITORING – Adaptive controls extend to hard wire, wireless, and annunciation.

2.0 TYPICAL GROWTH OF A GENERATOR SYSTEM USING A TOTAL INTEGRATED POWER SYSTEM PLATFORM:

While most generator applications in North America are standby to the utility supply, the expansion strategy of an IPS system also applies to prime power applications. The following, as indicated in ***figure-1***, demonstrates a typical growth strategy for a generator system application using a range of generators built to an IPS design platform.

2.1 APPLICATION POWERED BY THE GRID/UTILITY – Phase one of most power applications are typically a facility (in this sample a health facility) receiving power directly from the grid with no alternative power source. See ***figure-1A***.

2.2 APPLICATION INSTALLS FIRST STANDBY GENERATOR – Phase two sees the adoption of a single standby generator to provide power to essential loads should grid power go off-line. The first generator application is an integrated Power System (IPS) with a Kohler engine designed on a platform to serve a wide kW power band and a generator end compatible with any required extension of the system. Controls are designed by the factory so that then can be fully integrated with any future expansion of on-site power. Diagnostics controls, as well as automatic transfer switches (ATS), through which the load is fed, can also be fully integrated into future expansions of the system. See ***figure-1B.***

2.3 APPLICATION INSTALLS SECOND GENERATOR – As the facility expands Phase Three sees the addition of a second standby generator system. An IPS system lets the facility add more power and still retain the original generator. Additional power requirements are met by paralleling a second generator. The size of the generator will be determined by the load and other logistics. An IPS designed range of equipment ensures paralleling switchgear is designed to be compatible with the controls, monitoring and diagnostics of the first generator. See ***figure-1C.***

2.4 APPLICATION INSTALLS THIRD GENERATOR – Phase four expansion is the introduction of a third generator using to same platform and controls to now parallel three generators. The system is designed to parallel up to eight generators. See ***figure-1D.***

2.5 EXPANSION WITH A COMPLETE RANGE OF IPS ACCESSORIES – An IPS design philosophy takes into account a whole range of scenarios as a facility continues to grow, for example:

2.5.1 Enclosures - Should the original location be located inside the facility but there is now insufficient internal space for expansion; an IPS open generator is designed to receive a factory-designed drop-over enclosure, walk-in enclosure or container. This permits the generator or future generators to be located outside the facility. See ***figure-1E.***

2.5.2 Fuel Tanks - The diesel platform is designed to sit on a range of UL approved diesel fuel tanks. See ***figure-1F.***

2.5.3 Exhaust After Treatment - Generator emissions are subject to EPA and local emission standards. Not all equipment is grand fathered in as emission standards become more rigid. IPS allows for the fitting of exhaust aftertreatment equipment over the existing platform. See ***figure-1H.***

3.0 SUMMARY ADVANTAGES OF FACTORY SUPPLIED AND DESIGNED IPS GENERATOR RANGE:

When system designers and facility managers look towards their future power requirements when they envisage expansion of any given facility/application they should consider the following advantages of selecting a factory supplied and designed IPS package:

3.1 ABILITY TO BUILD ON EXISTING INSTALLATION – The original equipment doesn't become redundant but an integral part.

3.2 EXPANSION WITH FLEXIBLE OPTIONS – The modular approach provides several options to consider, no locked-in limits.

3.3 COMMONALITY OF SYSTEMS – Controls, monitoring and diagnostics are common across all growth platforms. Parts across a wider range of power nodes are the same for better provisioning, cost and training, and ease of service.

3.4 COST EFFECTIVE EXPANSION – By building on existing platforms, the higher costs of replacement are avoided.

To fulfill our commitment to be the leading supplier in the power generation industry, the Buckeye Power Sales team ensures they are always up-to-date with the current power industry standards as well as industry trends. As a service, our Information Sheets are circulated on a regular basis to existing and potential power customers to maintain their awareness of changes and developments in standards, codes and technology within the power industry.

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