## BUILDING ENERGY CODES
## by William L. Burns, AIA

New Mexico Architects are familiar with the existing prescriptive energy code that currently applies to all in-state projects. Chapter 53 of the Uniform Building Code is a modification of the ASHRAE 90-75 developed by the American Society of Heating, Refrigerating and Air Conditioning Engineers. There is, however, a new federal regulation in the making that is planned to replace the present energy codes. The code is being developed by the Department of Energy and is commonly referred to as BEPS (Building Energy Performance Standards).

Architects and building Owners alike can not be happy with the prospect of another building code, especially the BEPS which requires sophisticated computer runs to prove compliance. But the energy codes seem necessary because of the existing barriers and general reluctance to accept conservation. The obvious barriers are as follows:

1. Cheap Fossil Fuels: Even though current fuel costs have tripled and future fuel is expected to inflate up to 20% annually, the fuel costs are still cheap when compared to alternative energy sources.

2. Commercial Tax Laws: Many features of the tax laws promote cheap, energy-wasting systems. Energy saving devices require an upfront capital investment that must be depreciated over the equipment's life, whereas operating expenses are totally deductible in the year incurred.

3. Increased Initial Cost: Financial institutions make loans based upon costs of initial construction and operation costs of historical building systems. Therefore, an Owner cannot obtain mortgage money for energy saving devices and must either buy the equipment out of his own pocket or pay the penalty for increased operation costs. Even if the Owner includes energy saving devices, the mortgage company will probably not credit the reduced operating expense to increase the building's loan value.

4. Rental/Speculation Building: Speculators who construct buildings for immediate resale will always attempt to minimize the intial cost of the building, and will not make any energy saving investment which would add even minimally to that first cost. Because today's Owners of rental property exclude most operating expenses from their lease, the building Owner is not motivated to include any energy saving system that will require more capital investment.

### AMERICAN AUTOMOBILE INDUSTRY

The American Automobile Industry is a good illustration of the results of ignoring the Owner's demands for increased energy conservation. Before the federal government established fuel consumption requirements, our automobile manufacturers were not providing the fuel efficient automobiles the consumers were demanding. In fact the automobile manufacturers fought the adoption of the conservation standards citing that the standards were too restrictive and that the cost of changing systems was too costly. Because our manufacturers were reluctant to change, the consumers quickly found that foreign manufacturers offered them a wide range of fuel efficient transportation. These cars performed the same function as the American made cars, but were smaller, lighter and had very efficient engines and therefore cost much less to operate. *(We are all watching the auto industries belated efforts towards providing energy, and cost, efficient automobiles. Editor.)*

Hopefully, Architects and Engineers will not make the mistakes of the American Automobile Industry. We should be more flexible than a manufacturer of a mass produced automobile and be able to accommodate energy conserving features within our buildings.

**William L. Burns, AIA**

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### BUILDING ENERGY PERFORMANCE STANDARDS (BEPS)

The Energy Conservation and Production Act of 1976, Public Law 94-385, mandated the development of energy performance standards for the design of new buildings by 1980. Standards are to be performance oriented, rather than prescriptive. The objective is to not restrict the art of building conscious design, but to accommodate the development of technology and design innovation. This system is similar to the U.S. Department of Transportation's requirement to set

fuel consumption targets for new cars. The standards are to encourage maximum practicable improvements in energy efficiency and increased use of non-depletable energy resources. Specifically, the standards are to be applied at the design stage of each building, before its construction; they are to take the form of energy budgets, putting a ceiling, for example, on consumption of BTU's per square foot per year, based upon a particular climate and building type. The standards are to reflect the energy consumption of a building as estimated from the design using an accepted set of assumptions about building occupancy and operation. The particular State, and not the U.S. Government, must certify that buildings meet BEPS.

The Department of energy has issued a "Notice of Proposed Rulemaking" for Energy Performance Standards for New Buildings, dated November 1979. Copies of the code can be obtained from the DOE Albuquerque Operations Office. In addition to establishing the energy budget for each area and building type, the code gives acceptable evaluation techniques to prove that buildings meet the code's requirements. Basically, these evaluation techniques consists of three public domain computer programs (DOE-2, TRANSYS and DEROB) and climate data for 78 cities. The estimated predicted results are supposed to be within +/− 15% of a building's actual energy consumption.

The proposed edition of BEPS uses weighted factors for fossil fuels in commercial application's natural gas is 1; oil is 1.20, and electricity is 3.08. The designer first calculates the energy requirements by fuel type, expressed in MBTU/sq. ft./yr., and then multiplies by the weighting factors for each fuel type. The total sum of these factors is the Energy Budget Level. For Albuquerque, the allowable Energy Budget Level, expressed in MBTU/sq. ft./yr., is as follows: (1) Hospital = 353, (2) Nursing Home = 164, (3) Small Office = 104, (4) Elementary School = 96, (5) Shopping Center = 185. Interestingly energy supplied by solar energy systems is not included in the Energy Budget Level, therefore a building design may use as much solar energy as desired. This should be another incentive for solar energy.

So that the Architect can be sure that his building design meets BEPS during the initial design stages, he can usually rely upon easier and simpler programs that can be run on the popular minicomputers. The Princeton Energy Group is one such company developing these programs. These programs can be a great aid to the Architect during the design stages without the expense involved in a full DOE-2 computer run. But the DOE-2, TRNSYS or DEROB will be required after the construction documents are complete, as proof that the building conforms to BEPS.

The BEPS as published has run into a great deal of opposition, and some of it is justified because all of the "bugs" have not been worked out. Of instance, any project within New Mexico has its energy budget established as if the project were located in Albuquerque, because no other areas are given for the State even though our climate varies greatly. Also, the fuel weighted factors are controversial and incomplete since LPG is not considered.

By far the biggest complaint is the anticipated cost of proving compliance with BEPS. DOE-2 is a very complicated computer program that is currently only available for CDC 7600 systems. It has been estimated to take an average of one-man week just to program the machine for a small project without a complicated mechanical system. Also there are some that doubt DOE-2 abilities to accurately measure energy consumption. DOE-2 has not been widely tested in real building applications, but the results of the computer model are suppose to be within 15% of a building's actual performance.

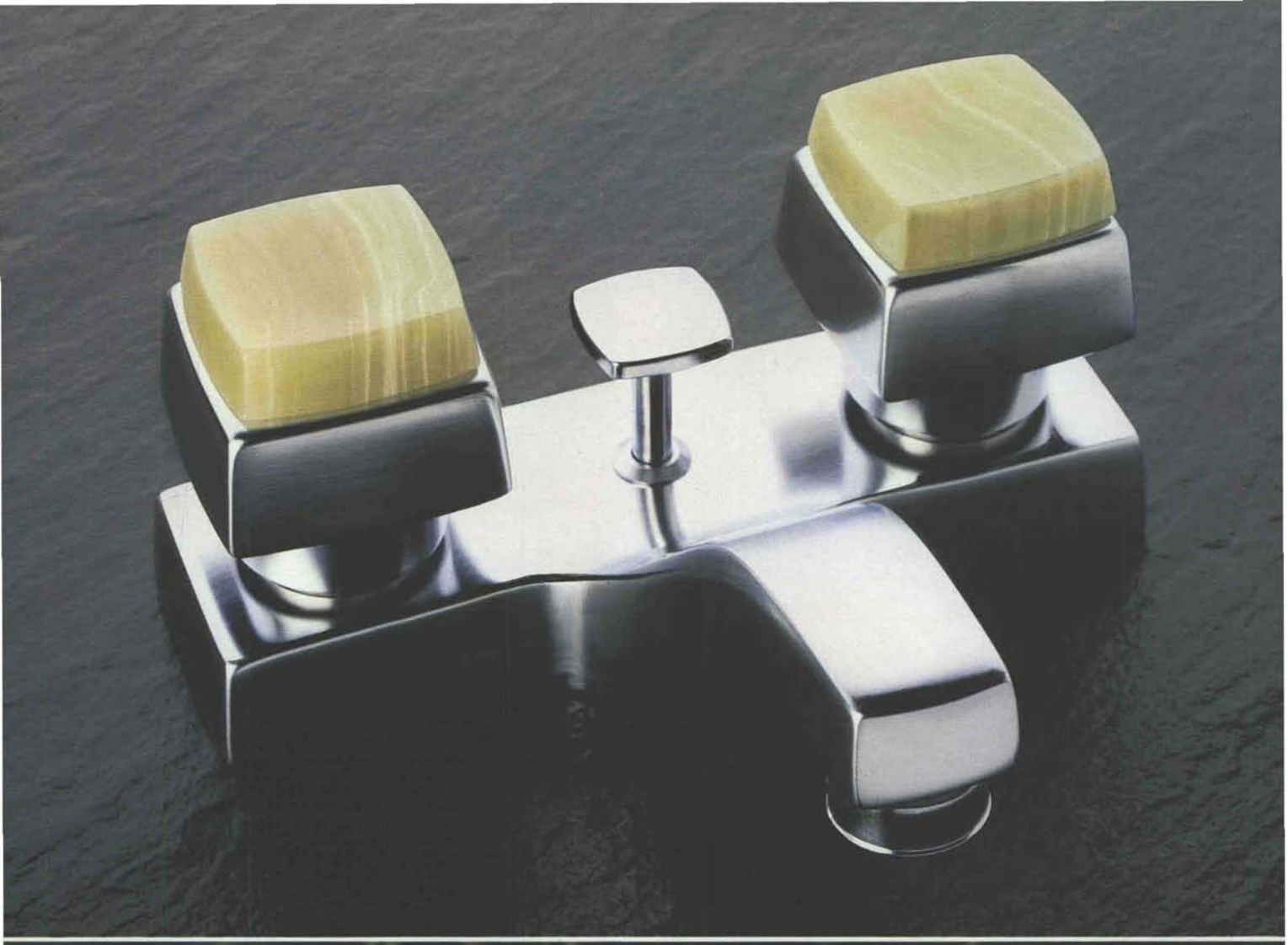
## THE AMERICAN INSTITUTE OF ARCHITECTS

The American Institute of Architects has recognized the Architect's responsibility to create energy efficient buildings. In 1972 the AIA appointed a task force to explore the relationships between energy and the built environment and to determine how the design professions can contribute to solving the nation's energy problem. In 1975 the AIA adopted the task force's report titled "A Nation of Energy Efficient Buildings by 1990". This report outlines a national program to achieve the potentials of energy efficient buildings. It projects energy savings of 30% for retrofitting old buildings and 60% for new buildings initially designed to be energy efficient. The report shows how the program can be made economically, financially and administratively feasible, and presents a series of recommendations for immediate action.

The American Institute of Architects lobbied for Public Law 94-385 and has continued to support the development of the law into the present Department of Energy (DOE) design standards called Building Energy Performance Standards (BEPS). In fact, the AIA Research Corporation (AIA/RC) contracted to DOE to provide 168 different projects, located throughout the United States, that are specifically designed for energy conservation. These energy conscious designs are for actual existing buildings constructed in 1975 and 1976 which represent the first generation of buildings designed after the 1973 oil embargo. The energy conscious re-design was subcontracted by AIA/RC to the original Architect and Design Teams. The Burns/Peters Groups was one of the firms selected for this program. Our project was the redesign of the Southwestern Electrical Building, Albuquerque. The building program requirements were only modified to include energy-conscious redesign that represented the current state-of-the-art, not the leading edge of technology. The project original site and functional program was retained. The Design Teams attended workshops and preliminary and final design reviews sponsored by AIA/RC. The results of this effort was the production of comparative sets of energy performance data for the original building and the energy conscious re-design. The figures reveal that including energy consciousness into the design process can lead to an average savings of a 40% reduction in energy. *W.L.B.*

# ALTERNA ONYX

FAUCETS IN THE KOHLER TRADITION



**Alterna Onyx.** Kohler puts gemstones in the most unexpected places.

For centuries the world has recognized the beauty of onyx. In delicate cameos. In beautiful sculpture.

Now Kohler brings the elegance of natural onyx into the bath and powder room. With high-fashion onyx inserts designed for the faucet handles in the Alterna™ line.

Hewn from quarries around the world and fashioned exclusively for Kohler by European craftsmen, Alterna Onyx inserts are offered in four color choices—Persian Chocolate...a rich, mottled brown; Turkish Firelight... elegant bands of brown, gold and cream onyx; Argentine Mist...a gentle green, and Turkish Pearl...a softly banded white.

Onyx insert colors were selected to enhance Kohler's palette of 15 fixture colors and four faucet finishes.

Because the inserts are cut from natural onyx, no two are colored or banded exactly alike...an exclusive feature rarely found in today's market.

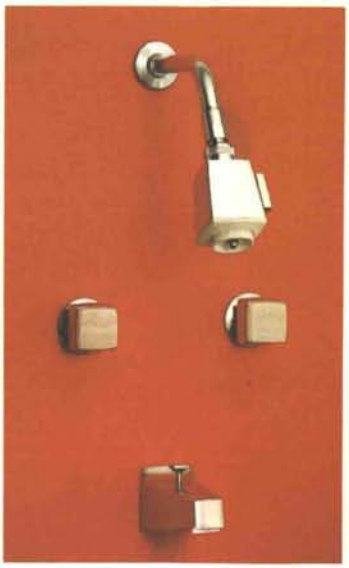
Inserts in white and green are specially cut across the onyx grain to provide beautiful bandings.

Alterna Onyx inserts are packaged in two-pair sets—white and green or two browntones—to complement Alterna Water-Guard lavatory faucets in satin or polished 24 carat gold electroplate or chromium finishes. The color combinations enhance the decorating versatility the Alterna faucet line offers. Inserts offer quick change artistry—they snap into, and out of, the Alterna handles.

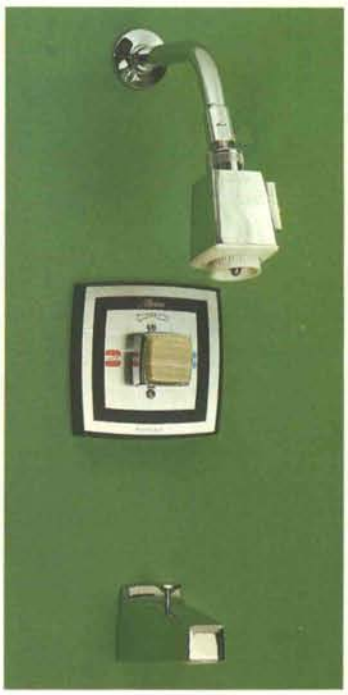
*Shown at left:* Alterna Water-Guard lavatory faucet in satin chromium with Argentine Mist onyx inserts. Lady Vanity Alterna Water-Guard faucet in 24 carat polished gold electroplate with swing-away spout, shampoo spray, onyx inserts in Persian Chocolate.

**Kohler Alterna Onyx** . . . versatile, imaginative, beautiful. To meet a mood, complement a decorating theme and help save water and energy at the same time. All Alterna Onyx and Alterna lavatory and sink faucets with aerators are now Water-Guard faucets, providing water-saving flow control at no additional cost. Water-Guard faucets have a standard flow rate of 2 to 2.75 GPM at water pressures of 40-80 PSI, and a maximum flow of 3 GPM. Dependable Valet® anti-drip valve units are used throughout to ensure long valve life and complete command of water flow. *Pictured above:* Alterna Water-Guard lavatory faucet (K-6925) in polished chromium with Turkish Pearl onyx inserts from K-9627 onyx kit.

**Onyx inserts** in Turkish Firelight complement Alterna Water-Guard lavatory faucet in satin 24 carat gold electroplate.



**Alterna Onyx faucets** . . . for bath/shower installations. Kohler's Suburban Water-Guard showerhead was created especially for the Alterna line. Its spray face and internal working parts are fashioned from Noryl to help prevent corrosion and lime build-up. Smooth working regulator adjusts spray from light to drenching for a more enjoyable shower. Water-Guard showerheads have a maximum flow of 3 GPM . . . 50% less than most conventional showerheads. This water-saving, energy-saving feature is available at no additional cost. *Pictured:* K-6931 Alterna bath/shower fitting in satin chromium with Argentine Mist onyx inserts from onyx kit K-9627.



**Four onyx inserts,** a choice of four finishes and the safety and comfort of a pressure-compensating bath/shower control can be yours with Alterna Onyx Rite-Temp. Adjust a single control to mix hot and cold water to a desired temperature and Rite-Temp maintains that temperature regardless of pressure changes in the available water supply. Valve unit made of non-corrosive material to combat "lime" build-up. *Pictured:* K-6900 Alterna Onyx Rite-Temp, Suburban Water-Guard showerhead and diverter tub spout in polished chromium with Argentine Mist onyx insert from K-9629 onyx kit.

# ALTERNA ONYX

**Alterna from Kohler.** A faucet line for discriminating homeowners. Alterna faucets are furnished in a choice of four finishes—satin or polished 24 carat gold electroplate or chromium. Four pairs of interchangeable plastic handle inserts are supplied with every faucet. Insert colors include Teak, Ebony, Walnut and White.

Changing handle inserts is easy. And the result is a refreshing change for bathroom, powder room and kitchen.

Alterna faucets. Quality crafted inside and out...with Kohler Valvet® valve units to ensure extended service and smooth command of water flow. What's more, Alterna lavatory and sink faucets with aerators offer Kohler's Water-Guard flow control to help save water and energy.

## HOW TO ORDER

Onyx inserts for lavatory and bath/shower faucets are offered in two-pair sets—two Turkish Pearl and two Argentine Mist inserts . . . or . . . two Persian Chocolate and two Turkish Firelight inserts per package. Onyx inserts for Alterna Rite-Temp are offered in sets of one Turkish Pearl and one Argentine Mist or one Persian Chocolate and one Turkish Firelight insert per package.

To order onyx inserts, add the following onyx kit numbers to the Alterna faucet plate number:

**K-9625** Onyx kit—2 white and 2 green inserts
**K-9626** Onyx kit—2 dark brown and 2 light brown inserts
(For K-6950, K-6956, K-6962 lavatory faucets; K-6973 sink

**K-9627** Onyx kit—2 white and 2 green inserts
**K-9628** Onyx kit—2 dark brown and 2 light brown inserts
(For K-6926, K-6929, K-6930, K-6931, K-6933, K-6934 bath and shower faucets; K-6952, K-6955 lavatory faucets; K-9291, K-9295, K-9297 bidet fittings.)

**K-9629** Onyx kit—1 white and 1 green
**K-9630** Onyx kit—1 dark brown and 1 light brown insert
(For K-6900 and K-6902 Alterna Rite-Temp single control bath/shower faucet.)

Four pairs of interchangeable plastic handle inserts in Teak, Walnut, Ebony and White are supplied with every Alterna faucet.

**Kohler's Alterna** faucets bring quick-change artistry to bath/shower installations, lavatory basins and kitchen sinks. *Pictured top:* Handle inserts in Teak, Ebony, White and Walnut are packaged with every Alterna faucet. *Above:* Alterna Water-Guard lavatory faucet in satin finish 24 carat gold electroplate, satin finish. *Left:* Suburban Water-Guard showerhead complements Alterna faucet design. It features Noryl spray face and internal working parts to help prevent clogging and corrosion. Maximum flow: 3 GPM to help save water and energy. Shown in satin chromium finish.

# ALTERNA

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